

UNITED STATES DEPARTMENT OF AGRICULTURE
BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

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A BIBLIOGRAPHY OF NICOTINE

PART II

THE INSECTICIDAL USES OF NICOTINE AND TOBACCO

BY N. E. McINDOO, senior entomologist, Division of Control Investigations,
R. C. ROARK, principal chemist, and Mrs. R. L. BUSBEY, junior chemist,
Division of Insecticide Investigations

SECTION 2

Washington, D. C.
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E-392

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CONTENTS OF PART II

SECTION 1

	Citations
I. Introduction	
A. Early publications, 1690-1900 - - - - -	1-132
B. Proprietary nicotine preparations, 1885-1933 - - - - -	133-200
C. Condensed tobacco juice and titrated nicotine, 1882-1928 - -	201-256
D. Homoptera: Aphididae (1836-1934)	
1. Woolly apple aphid, 1836-1934 - - - - -	257-299
2. Other aphids on apple trees, 1904-1934 - - - - -	300-347
3. Aphids on peach trees, 1903-1933 - - - - -	348-383
4. Aphids harmful to other fruits, 1907-1933 - - - - -	384-438
5. Nasturtium or bean aphid, 1915-1934 - - - - -	439-459
6. Aphids on cabbage and turnip, 1908-1926 - - - - -	460-470
7. Aphids on potato, 1915-1930 - - - - -	471-485
8. Aphids on other vegetables, 1895-1932 - - - - -	486-499
9. Aphids on hop, cereals, and tobacco, 1904-1931 - - - - -	500-517
10. Melon or cotton aphid, 1906-1930 - - - - -	518-536
11. Aphids on shrubs, and shade and forest trees, 1907-1934 -	537-566
12. Other aphids, 1912-1934 - - - - -	567-584
E. Homoptera: Aleyrodidae and Coccidae (1894-1933)	
1. Whiteflies (Aleyrodidae), 1905-1932 - - - - -	585-594
2. Coccids, mealybugs, and scale insects (Coccidae), 1894-1933	595-667
F. Homoptera: Other families (1828-1934)	
1. Jassids, including apple, potato, and grape leafhoppers (Cicadellidae), 1828-1934 - - - - -	668-753
2. Cicadidae, Fulgoridae, Cercopidae, and Membracidae, 1914-34	754-769
3. Apple sucker, pear psylla, and other psyllids (Chermidae), 1913-1934 - - - - -	770-833
Index to section 1	

SECTION 2

G. Heteroptera (1903-1934)	
1. Tarnished plant bugs, apple bugs, redbugs, and other capsids (Miridae), 1903-1934 - - - - -	834-909
2. Lacebugs or tingids (Tingidae), 1914-1933 - - - - -	910-930
3. Chinch bugs and other lygaeids (Lygaeidae), 1913-1933 - -	931-952
4. Squash bug and other coreids (Coreidae), 1913-1933 - - -	953-964
5. Pentatomid bugs and other Heteroptera, 1912-1933 - - - -	965-975

H. Thysanoptera (thrips), 1877-1934	976-1085
I. Acarina (1902-1934)	
1. Red spiders, 1904-1934	1086-1119
2. Other mites, 1902-1933	1120-1149
J. External parasites on man and animals, 1866-1931	1150-1207
K. Diptera (1795-1934)	
1. Flies as pests of man and animals, 1795-1932	1207-1238
2. Mosquitoes, 1900-1933	1239-1250
3. Midgelike flies, 1879-1934	1251-1278
4. Mushroom flies, 1912-1933	1279-1285
5. Beet fly, 1917-1933	1286-1296
6. Root maggots, 1857-1929	1297-1316
7. Other flies, 1912-1934	1317-1340
L. Hymenoptera (1898-1934)	
1. Apple sawfly, 1929-1934	1341-1350
2. Other sawflies, 1898-1934	1351-1391
3. Ants, 1908-1933	1392-1400
4. Bees, 1910-1933	1401-1406
M. Coleoptera (1899-1934)	
1. Flea beetles, 1903-1934	1407-1444
2. Cucumber, asparagus, and raspberry beetles, 1899-1933	1445-1464
3. Other beetles, 1905-1934	1465-1533
Index to section 2	

SECTION 3

N. Lepidoptera (1813-1934)	
1. Grapevine moths, 1870-1933	1534-1595
2. Codling moth, 1897-1934	1596-1711
3. Oriental peach moth, 1917-1930	1712-1740
4. Leaf miners and casebearers, 1911-1933	1741-1756
5. Fruit-tree borers and budmoths, 1813-1932	1757-1776
6. Caterpillars (Hyponomeuta) on fruit trees, 1913-1934	1777-1786
7. Olive moths, 1903-1929	1787-1793
8. Leaf rollers, 1912-1933	1794-1802
9. Cranberry moths, 1890-1933	1803-1815
10. Other Lepidoptera harmful to fruits, 1825-1934	1816-1844
11. Cabbage insects, 1910-1934	1845-1872
12. European corn borer and corn ear worm, 1905-1934	1873-1882
13. Lepidoptera harmful to shrubs, and shade and forest trees, 1905-1934	1883-1906
14. Other Lepidoptera, 1902-1933	1907-1961
O. Miscellaneous pests (1885-1934)	
1. Springtails and <u>Lepisma</u> , 1921-1933	1962-1969
2. Orthoptera, earwigs, and termites, 1909-1930	1970-1981
3. Species of insects not named, 1903-1934	1982-2043
4. Species of insects named, 1901-1933	2044-2088
5. Greenhouse pests, 1885-1929	2089-2115
6. Millipedes and centipedes, 1917-1925	2116-2120

P. How nicotine kills, reactions, symptoms, minimum dosage, etc. 1900-1934 - - - - -	2121-2179
Q. Nicotine tannate and oleate, 1918-1934 - - - - -	2180-2202
R. Oil emulsions and miscible oils combined with nicotine, 1915-1934 - - - - -	2203-2268
S. Nicotine dusts, (1908-1934)	
1. Kinds and early history, 1908-1924 - - - - -	2269-2281
2. Preparations of dusts, dusting machinery, and principles involved, 1921-1932 - - - - -	2282-2347
3. Against Homoptera (1921-1934)	
(a) Aphids, 1921-1934 - - - - -	2348-2403
(b) Psyllids and leafhoppers, 1921-1934 - - - - -	2404-2421
4. Against Heteroptera, 1921-1933 - - - - -	2422-2436
5. Against Coleoptera, 1922-1933 - - - - -	2437-2460
6. Against Diptera, 1925-1933 - - - - -	2461-2468
7. Against Lepidoptera, 1922-1931 - - - - -	2469-2474
8. Against thrips, springtails, and mites, 1921-1934 - - - -	2475-2497
Index to section 3	



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G. HETEROPTERA, 1903-1934

1. Tarnished Plant Bugs, Apple Bugs, Red Bugs, and Other Capsids (Miridae), 1903-1934

ANONYMOUS

(834)

1915. THE CONTROL OF ORCHARD PESTS. Canad. Hort. 38 (3): 88-89. [Abstract in Rev. Appl. Ent. (A) 3: 407. 1915.]

The best control for the tarnished plant bug (Lygus pratensis) is a spray of Black Leaf 40, 3/4 lb. to 100 gal. water, when the apple and pear blossoms are falling. The best spray against the apple aphid (Aphis pomi) is a mixture of lime-sulphur 28°Bé., Black Leaf 40 (1-1,500), and Flour paste applied at the time of the opening of the flower buds.

TREHERNE, R. C.

(835)

1915. THE TARNISHED PLANT-BUG (LYGUS PRATENSIS, LINN.) Ent. Soc. Brit. Columbia [Victoria] Proc. No. 7, pp. 16-18. [Abstract in Rev. Appl. Ent. (A) 4: 26. 1916.]

The destruction of weeds in orchards, trapping by sticky shields, and spraying with dilute kerosene emulsion or nicotine extracts at the time when nymphs are present are recommended.

ANONYMOUS

(836)

1917. MISCELLANEOUS INSECT NOTES. Conn. State Ent. Rept. 16 (1916): 138-146, illus. [Abstract in Rev. Appl. Ent. (A) 5: 310-311. 1917.]

The tarnished plant bug (Lygus pratensis L.) is difficult to control. A thorough spray of Black Leaf 40, 1 pt. in 50 gal. water to which has been added 2 lb. laundry soap, should prove effective against it on tobacco. Trees attacked by hickory-gall aphids (Phylloxera caryoseaulis Fitch) would probably be protected if sprayed with nicotine solution when the buds are opening.

MOLZ, E.

(837)

1918. LYGUS PRATENSIS L., A SERIOUS PEST OF POTATOES. Ztschr. Pflanzkrankh. 27 (7-8): 337-339. [In German. Abstract in Rev. Appl. Ent. (A) 8: 346. 1920.]

A 3 to 4 percent tobacco solution proved useless against Lygus pratensis on potatoes.

BODENHEIMER, F.

(838)

- 1920 (?) CHRYSANTHEMUM BUGS AND THE GALLS PRODUCED BY THEM. Ztschr. Pflanzenkrankh. 31 (3-4): 97-100. [Abstract in Rev. Appl. Ent. (A) 9: 590. 1921.]

Repeated spraying with nicotine soap, especially at the time of first appearance is fairly successful in controlling the capsids Lygus boulinus Fall and L. pratensis var. campestris Fall and the anthocorid Triphleps majuscula Rent.

MacLENNAN, A. H.

(839)

1922. NEW METHODS DEVELOPED IN CONTROL OF INSECTS AND FUNGUS DISEASES. Ont. Veg. Growers' Assoc. 17th Ann. Rept. 1921, pp. 32-38. [Abstract in Rev. Appl. Ent. (A) 10: 611-612. 1922.]

An effective remedy for the tarnished plant-bug (Lygus pratensis Fall.) which is the cause of heart-rot in celery is a dust mixture of 20 parts of bordeaux (11 percent), 30 parts lime, 20 parts sulphur, and 30 parts tobacco dust. This should be dusted thoroughly into the hearts of the plants once each week.

WALLACE, F. N., et al.

(840)

1923. REPORT OF THE DIVISION OF ENTOMOLOGY. Ind. Dept. Conserv. 4th Ann. Rept. 1921-1922, pp.26-40. [Abstract in Rev. Appl. Ent. (A) 11: 309-310. 1923.]

For most species of aphids spraying with 1 fl. oz. 40 percent nicotine sulphate, 5 oz. fish-oil soap, and 5 gal. water is recommended. The young of the tarnished plant bug (Lygus pratensis L.) may be killed by spraying with 1 fl. oz. 40 percent nicotine sulphate, 4 oz. fish-oil soap, and 4 gal. water, but this is ineffective against the adults.

HASEMAN, L.

(841)

1928. TARNISHED PLANT BUG INJURY TO STRAWBERRIES. Jour. Econ. Ent. 21: 191-193. [Abstract in Rev. Appl. Ent. (A) 16: 400-401. 1928.]

Young nymphs of the tarnished plant bug (Lygus pratensis L.) may be destroyed by application of nicotine spray or dust.

AUSTIN, M. D.

(842)

1932. A PRELIMINARY NOTE ON THE TARNISHED PLANT BUG (LYGUS PRATENSIS LINN.). Jour. Roy. Hort. Soc. 57 (2): 312-320, illus. [Abstract in Rev. Appl. Ent. (A) 20: 661-662. 1932.]

If insecticides such as nicotine sprays are used, a thorough drenching of plants and insects is necessary to secure maximum efficiency.

HASEMAN, L., and JOHNSON, P. H.

(843)

1933. ENTOMOLOGY. Mo. Agr. Expt. Sta. Bull. 328, pp. 27-30, illus. [Abstract in Rev. Appl. Ent. (A) 21: 650-651. 1933.]

Encouraging results against the tarnished plant bug (Lygus pratensis L.) on strawberries were obtained with a spray of 4 oz. potash vegetable-oil soap and 1 gal. water, which appeared to be improved by the addition of 40-percent nicotine sulphate (1-1,600). When Aphis gossypii Glov. are first seen on melons, the infested hills should be treated with nicotine.

VENABLES, E. P.

(844)

1933. NOTES ON THE TARNISHED PLANT BUG IN THE DRY BELT OF BRITISH COLUMBIA. Ent. Soc. Brit. Columbia. Proc. No. 30, pp. 17-20. [Abstract in Rev. Appl. Ent. (A) 22: 102-109. 1934.]

A nicotine dust proved of no value against the adults of Lygus pratensis L.

PARROTT, P. J., and HODGKISS, H. E.

(845)

1913. THE FALSE TARNISHED PLANT-BUG AS A PEAR PEST. N. Y. Agr. Expt. Sta. Bull. 368, pp. 363-384, illus. [Abstract in Rev. Appl. Ent. (A) 2: 134-135. 1914.]

Black Leaf 40, 3/4 pt. to 100 gal. water, plus 3 lb. soap, has given the most satisfactory results against Lygus invitus Say. The trees should be drenched just after the blossoming period and both surfaces of the leaves wetted.

BRITAIN, W. H.

(846)

1915. THE GREEN APPLE BUG ON APPLES AND PEARS. Canad. Hort. 23 (12): 269-270. [Abstract in Rev. Appl. Ent. (A) 4: 96-97. 1916.]

Spraying with Black leaf 40, 1 pt. to 100 gal. water just before and after the blossoms fall and again five days later is suggested for the control of the false tarnished plant bug Lygus invitus.

SANDERS, G. E., and BRITAIN, W. H.

(847)

1916. SPRAYING FOR INSECTS AFFECTING APPLE ORCHARDS IN NOVA SCOTIA. Can. Dept. Agr. Ent. Br., Circ. 8, 11 pp. [Abstract in Rev. Appl. Ent. (A) 5: 176-177. 1917.]

In order to aid in the control of the green apple bug Lygus communis var. novascotiensis Knight) apple trees should be sprayed with nicotine sulphate, just before the blossoms open and again, if necessary, just after they fall.

BRITAIN, W. H.

(848)

1918. PRACTICAL RESULTS IN SPRAYING A COMMERCIAL ORCHARD FOR THE GREEN APPLE BUG. Canad. Ent. 50 (12): 393-397. [Abstract in Rev. Appl. Ent. (A) 7: 168-169. 1919.]

FLACHS, K.

(858)

1930. INJURY TO CULTIVATED PLANTS BY EGGS IN THE SUMMER OF 1929.
Prakt. Bl. Pflanzenb. 8 (5): 98-102. [In German. Abstract in Rev.
Appl. Ent. (A) 18: 637. 1930.]

Against Lygus kalinii L., which injures the heart leaves of celery, the leaves should be dusted with a mixture of 2 parts quicklime and 1 part sulphur, or a spray of nicotine-soap may be used.

GARMAN, P.

(859)

1929. PLANT BUG INJURY TO FRUITS. Conn. Agr. Expt. Sta. Bull. 305, pp. 729-731, illus. [Abstract in Rev. Appl. Ent. (A) 17: 609-610. 1929.]

Injury to peaches was caused by the capsids Lygus quescalbae Knight and L. omnivagus Knight. Dusting with nicotine caused the bugs to drop from the trees although they were not all killed.

CROSEY, C. R., and LEONARD, M. D.

(860)

1915. INSECTS INJURIOUS TO THE FRUIT OF THE APPLE. Cornell Reading Courses. 4 (84): 121-144, illus. March 15. [Abstract in Rev. Appl. Ent. (A) 3: 413-414. 1915.]

Spraying with Black Leaf 40 (1:800) with 4 or 5 lb. soap per 100 gal. effectually controls the apple redbugs Heterocordylus malinus and Lygidea mendax. Application should be made as soon as the blossoms begin to open.

FELT, E. P.

(861)

1916. THIRTY-FIRST REPORT OF THE STATE ENTOMOLOGIST ON INJURIOUS AND OTHER INSECTS OF THE STATE OF NEW YORK 1915. N. Y. State Mus. Bull. 186, pp. 15-16, illus. [Abstract in Rev. Appl. Ent. (A) 4: 445-447. 1916.]

The most suitable spray against Heterocordylus malinus Reut. (redbug) and Lygidea mendax Reut. (lined redbug) consisted of 1 pt. tobacco extract in 100 gal. water together with lime-sulphur wash 1 to 25 with the addition of lead arsenate applied just before the blossoms opened. Large numbers of pear thrips Taeniothrips (Euthrips) pyri Dan. were killed by spraying with a mixture consisting of from 75 to 80 lb. lime, 100 gal. water, and 3/4 pt. Black Leaf 40.

HERRICK, G. W.

(862)

- 1920 (?) SOME ORCHARD PESTS OF THE PAST SEASON. N. Y. Hort. Soc. Proc. 2nd Ann. Meet. 1919, pp. 15-24, illus. [Abstract in Rev. Appl. Ent. (A) 9: 16. 1921.]

The addition of nicotine sulphate to the first codling moth spray just after the petals fall has given good results against the apple redbugs Heterocordylus malinus and Lygidea mendax. In severe infestations 1 pt. of nicotine sulphate may also be added to the spray before the blossoms open. The false tarnished plant bug (Lygus communis) on pears has been successfully controlled by the application of nicotine sulphate spray after the petals have fallen.

GUYTON, T. L., and KNULL, J. N.

(863)

1925. THE APPLE MAGGOT OR RAILROAD WORM. Pa. Dept. Agr. Circ. 1, 8 pp., illus. [Abstract in Rev. Appl. Ent. (A) 13: 327-328, 1925.]

For the control of the redbug Heterocordylus malinus Reut. nicotine sulphate (40-percent) should be added to the petal fall spray [1 1/4 gal. lime-sulphur 32-33° Be. plus 1 1/2 lb. lead arsenate powder to 50 gal.] at the rate of 3/4 pt. to 100 gal. spray solution. Nicotine sulphate may also be added to the delayed dormant spray [1 gal. lime-sulphur to 8 gal. water] for the control of aphids.

ANONYMOUS

(864)

1916. MISCELLANEOUS INSECT NOTES. Conn. Agr. Expt. Sta. Rept. 1915: 83-191, illus. [Abstract in Rev. Appl. Ent. (A) 4: 245-246, 1916.]

For the control of false apple redbug (Lygidea mendax Reut.) trees should be sprayed with Black Leaf 40, 1 pt. to 50 gal. water, with or without lead arsenate and fungicides, before the blossoms open and again just after the petals fall. Nicotine solution applied at high pressure would have killed most of the aphids (Aphis rumicis L., Macrosiphum solanifolii Ashm., and Myzus persicae Sulz.) on beets.

FELT, E. P.

(865)

1916. THIRTIETH REPORT OF THE STATE ENTOMOLOGIST 1914. N. Y. State Mus. Bull. 180, 336 pp., illus. [Abstract in Rev. Appl. Ent. (A) 4: 73-76, 1918.]

Practical tests showed that a midsummer spray of Black leaf 40 using 3/4 pt. to 100 gal. water and 4 to 8 lb. soap would severely check the pear psylla (Psylla pyricola Forst.) if not entirely destroy it. Black Leaf 40 is one of the most efficient controls of the lined redbug (Lygidea mendax Reut.).

BRITTON, W. E., and ZAPPE, M. P.

(866)

1918. EXPERIMENTS IN SPRAYING APPLE ORCHARDS TO CONTROL APHIDS AND FALSE RED-BUG. Conn. State Ent. 7th Rept. 1917. Conn. Agr. Expt. Sta. Bull. 203, pp. 259-262. [Abstract in Rev. Appl. Ent. (A) 6: 459, 1918.]

Spraying with 1 pt. Blackleaf 40, 2.5 lb. powdered lead arsenate, and 2 gal. commercial lime-sulphur in 100 gal. water was effective against false apple redbug (Lygidea mendax Reut.) but did not kill all the aphids (Aphis sorbi and A. pomi).

GOSSARD, H. A.

(867)

1918. THE FALSE APPLE RED-BUG. Ohio Agr. Expt. Sta. Monthly Bull. No. 29: 153-155, illus. [Abstract in Rev. Appl. Ent. (a) 7: 143. 1919.]

The most successful treatment against Lygidea mendax as yet discovered is spraying the nymphs with 40-percent nicotine sulphate at the rate of 1 pt. to each 87.5 gal. of the spray that is applied immediately after the falling of the blossoms. This can be used in combination with the lime-sulphur arsenical mixture given for codling moth (Cydia pomonella) and will also be useful against aphids.

CROSBY, C. R.

(868)

- 1920 (?) THE CONTROL OF THE APPLE REDBUGS. N. Y. Hort. Soc. Proc. 1st Ann. Meet. 1919, pp. 220-222. [Abstract in Rev. Appl. Ent. (A) 19: 180-191. 1921.]

Lygidea mendax is the most injurious species of redbug in New York State. The best time for spraying is as soon as possible after the bugs hatch or when about 3/4 of the petals have fallen, and the most effective spray is 1 pt. Black Leaf 40 to 100 gal. spray material, which is generally dilute lime-sulphur solution or lead arsenate. The most effective dust was 40 percent tobacco, 10 percent lead arsenate, and 50 percent sulphur mixture.

ZAPFE, M. P.

(869)

1921. NOTES ON THE LIFE HISTORY OF THE FALSE APPLE RED BUG IN CONNECTICUT (LYGIDEA MENDAX REUT.). Conn. Agr. Expt. Sta. Bull. 226, pp. 177-179. [Abstract in Rev. Appl. Ent. (A) 9: 292. 1921.]

Nicotine solution, 1 pt. to 100 gal. water, should be sprayed on the trees just before the blossom buds open. Nicotine should also be added to later sprays, especially that applied soon after the petals fall.

STEAR, J. R.

(870)

1923. RED BUG CONTROL IN SOUTHERN PENNSYLVANIA. Jour. Econ. Ent. 16: 548-550. [Abstract in Rev. Appl. Ent. (A) 12: 84. 1924.]

In regard to the false redbug (Lygidea mendax Reut.), nicotine sprays before the blossoms open were followed by varying results, and tests showed that a single careful application of nicotine at petal fall will give excellent control without an additional spray.

SOUTH, F. W.

(871)

1922. WORK OF THE INSPECTION STAFF (APRIL 1st-JUNE 30th, 1922). Malayan Agr. Jour. 10 (7): 195-199. [Abstract in Rev. Appl. Ent. (A) 11: 190. 1923.]

Mealybugs did some damage in south Perak to roselle, which was also attacked by Dysdercus sp. but the latter was controlled by a nicotine spray.

CAMPOS, R. F.

(872)

1923. TWO INSECT PESTS OF PLANTS IN ECUADOR. Rev. Col. Mac. Vicente Rocafructe 11 (38-39): 19-23, illus. [In Spanish. Abstract in Rev. Appl. Ent. (A) 19: 401. 1931.]

Dysdercus ruficollis L., D. concinnus Stal, and D. rufices Perty attack cotton and other malvaceous plants, and are best controlled by a nicotine spray, the ground at the foot of the plants being also wetted in order to destroy the eggs.

KNIGHT, H. H.

(873)

1918. AN INVESTIGATION OF THE SCARRING OF FRUIT CAUSED BY APPLE REDBUGS. Cornell Agr. Expt. Sta. Bull. 396, pp. 187-208, illus. [Abstract in Rev. Appl. Ent. (A) 7: 172-173. 1919.]

Spraying begun on April 30th, when the buds were just showing pink, with the usual lead arsenate and lime sulphur 1 to 40, to which had been added 1 qt. Black Leaf 40 to each 200 gal. resulted in the nymphs being killed with ease, direct contact with the spray not being necessary since they were overcome by the fumes.

PARROTT, P. J., STEWART, F. C., and GLASGOW, H.

(874)

1922. SPRAYING AND DUSTING EXPERIMENTS WITH APPLES IN 1922. N. Y. Agr. Expt. Sta. Circ. 63, 8 pp. [Abstract in Rev. Appl. Ent. (A) 11: 352-359. 1923.]

Dusting with sulphur-lead arsenate (90:10) and nicotine gave complete control in six applications against redbug, 5.68 percent of apples being injured by codling moth. Untreated trees showed 5.27 percent and 6 percent injury by redbug and codling moth respectively.

With the delayed dormant spray against rosy aphid of 25 lb. tobacco dust to 100 gal. lime-sulphur (1:40), 1.25 percent of the apples were injured and the next best results were obtained with 40 lb. tobacco dust to 100 gal. sulphur-glue mixture, and 3/4 pt. nicotine sulphate to 100 gal. lime-sulphur (1:40).

Untreated trees showed a percentage of 32.31 apples injured and dusting gave poor results compared with spraying.

HAWLEY, I. M.

(875)

1917. THE HOP REDBUG (PARACALOCORIS HAWLEYI KNIGHT). Jour. Econ. Ent. 10: 545-552. illus. [Abstract in Rev. Appl. Ent. (A) 6:109. 1918.]

Nicotine sulphate (1:800) plus 4 to 6 lb. soap per 100 gal. water apparently killed the insect immediately, though 3/8 pt. with 4 lb. soap per 100 gal. water proved ineffective. Winged forms fly before they can be reached by a spray.

D'UTRA, G.

(876)

1903. CONTRA OS INIMIGOS DO FUMO. Sec. Agr. São Paulo Bol. Agr. 4th ser. No. 3, pp. 111-122, illus.

Against the bug (Dicyphus minimus Uhler) on tobacco plants in Brazil a spray consisting of one part nicotine in 60 parts water is recommended.

INDA, J. R.

(877)

1907. EL PULGON DE LAS HOJAS DEL TABACO. Sec. Fomento Comision Parasitologia Agr., Mex. Cerc. No. 69, 6 pp., illus.

Against a bug (Dicyphus minimus) on tobacco a spray consisting of 1 part nicotine and 60 parts water is recommended in Mexico as being very effective (p. 4).

PETHYBRIDGE, G. H., LAFFERTY, H. A., and RHYNEHART, F. G.

(878)

1921. INVESTIGATIONS ON FLAX DISEASES. Jour. Dept. Agr. & Tech. Instr. Ireland. 21 (2): 167-187, illus. [Abstract in Rev. Appl. Ent. (A) 9: 446-447. 1921.]

Capsid plant bugs (Calocoris bipunctatus F.) on fruit trees have been controlled by spraying with nicotine and soap.

TROUVELOT, B.

(879)

1926. THE ORIGIN OF STONY FORMATIONS OF PEARS IN FRANCE AND RESEARCHES ON METHODS TO PREVENT THE DAMAGE IN ORCHARDS. Compt. Rend. Acad. Agr. France 12 (38): 1024-1029, illus. [In French. Abstract in Rev. Appl. Ent. (A) 15: 116. 1927.]

Nicotine sulphate and soap sprays were used against the larvae of a capsid (Calocoris fulvomaculatus DeG.), but the treatment was not entirely successful.

RAMACHANDRA, R. Y.

(880)

1928. ADMINISTRATION REPORT OF THE GOVERNMENT ENTOMOLOGIST, COIMBATORE, FOR 1927-1928. Coimbatore Agr. Res. Inst., 30 pp. [Abstract in Rev. Appl. Ent. (A) 17: 235-237. 1929.]

The most effective of the control measures tried against the capsid (Disphinctus politus Wlk.) was dusting with a combination of calcium cyanide and tobacco dust. Spraying with fish-oil resin soap and tobacco decoction, although effective in nurseries against thrips (Scirtothrips dorsalis Hood), failed to give good results when applied to transplanted crops.

RAMACHANDRA, R. Y.

(881)

1929. ADMINISTRATION REPORT OF THE GOVERNMENT ENTOMOLOGIST, COIMBATORE, FOR 1928-1929. Coimbatore Agr. Res. Inst., 38 pp. [Abstract in Rev. Appl. Ent. (A) 18: 193. 1930.]

A spray consisting of tobacco and soap was effective against capsids (Disphinctus politus Wlk.) on betel when directed so as to hit the insects. In a series of tests in South India with various insecticides against thrips (Scirtothrips dorsalis Hood) on chillies the best results were obtained with tobacco infusion.

RAO, Y. R.

(882)

1930. NOTES ON THE BETEL-VINE BUG- DISPHINCTUS POLITUS -AND ITS CONTROL. Madras Agr. Dept. Yearbook 1929; 35-47, illus. [Abstract in Biol. Abs. 6 (10): 2329. Entry 22649, 1932.]

This capsid bug is a serious pest of the betel vine in many districts of southern India. Dusting with various insecticides, such as calcium cyanide and tobacco dust, was of little use. Tobacco decoction combined with potash soap was effective, provided the spray was so directed as to drench the adults and young.

MOREIRA, C.

(883)

1923. LES CAPSIDES DU TABAC AU BRÉSIL. Rept. Internat. Conf. Phytopath. & Econ. Ent. Holland 1923, pp. 283-286. [Abstract in Rev. Appl. Ent. (A) 12: 65-66. 1924.]

For the control of the capsids Engytatus notatus Dist. and E. geniculatus Reut. the following spray is recommended: A paste of 1 gal. kerosene, 8 lb. hard soap and 1 gal. water is dissolved in 50 gal. warm water and allowed to cool; before application 0.1 percent nicotine or nicotine sulphate, that is 8 oz. per 50 gal. of emulsion, should be added. This spray should be applied every 10 days until the plants are free from infestation.

DEN DOOP, J. E. A.

(884)

1919. CALLOBELICUS NICOTIANAE KONINGSBERGER. Bull. Deli Proefstation, Medan, Sumatra, no. 12, August, 9 pp. [Abstract in Rev. Appl. Ent. (A) 7: 532. 1919.]

This capsid bug injures tobacco. A number of experiments were made with arsenic acid, arsenious acid, copper sulphate, nicotine tartrate, and strychnine tartrate, but none of these proved suitable.

CORY, E. N., and McCONNELL, P. A.

(885)

1927. THE PHLOX PLANT BUG. Md. Agr. Expt. Sta. Bull. 292, 22 pp. illus. [Abstract in Rev. Appl. Ent. (A) 16: 644. 1928.]

The phlox plant bug, Lopidea davisii Knight, was previously recorded as L. media Say. Of various insecticides used the most satisfactory results were secured with 40-percent nicotine sulphate (1:500) with soap as a spreader.

RORER, J. B.

(886)

1918. DISEASE AND PESTS OF CACAO IN ECUADOR AND MODERN METHODS APPROPRIATE TO THE CULTIVATION OF CACAO. Rept. presented to Agr. Assoc. of Ecuador, 79 pp., illus. [In Spanish. Abstract in Rev. Appl. Ent. (A) 7: 210-211. 1919.]

Nicotine sulphate has given good results against the nymphs of a capsid bug [Monalonion atratum (dissimulatum)].

ANONYMOUS.

(887)

1921. ENTOMOLOGIA. Bol. Assoc. Agr. Ecuador 1 (3), May., 2 pp. [Abstract in Rev. Appl. Ent. (A) 9: 546. 1921.]

Black Leaf 40 at 1-800 was found to kill the various stages of nymphs in 20-30 minutes but did not apparently kill the eggs of Monalonion atratum Dist. (= M. dissimulatum). The addition of soap seemed to prevent the eggs from hatching.

THEOBALD, F. V.

(888)

1927. THE VALUE OF TAR-DISTILLATE WASHES. Kent Farmers' Union Jour. 22. (4), 4 pp. [Abstract in Rev. Appl. Ent. (A) 16: 613. 1928.]

Since some insects, including capsids, leafhoppers, and certain Lepidoptera, are only partly controlled by use of tar-distillate washes, the author urges the continuance of the practice of grease banding and spring spraying with nicotine soap.

FRYER, J. C. F., and PETHERBRIDGE, F. R.

(889)

1917. REPORTS ON FURTHER INVESTIGATIONS ON THE CAPSIDS WHICH ATTACK APPLES. Jour. Bd. Agr. London 24 (1): 33-44, illus. [Abstract in Rev. Appl. Ent. (A) 5: 290. 1917.]

The highest proportion of marketable fruit was obtained from a plot sprayed with nicotine 3 oz., soft soap 4 lb., water 40 imperial gal. A mixture of lime-sulphur (sp. gr. 1.3) 1 gal., nicotine 2.5 oz., and water 40 imperial gal. also gave good results but did not kill the bugs so quickly.

FRYER, J. C. F. et al.

(890)

1921. REPORT ON THE OCCURRENCE OF INSECT AND FUNGUS PESTS ON PLANTS IN ENGLAND AND WALES FOR THE YEAR 1919. Min. Agr. & Fisheries Misc. Publ. 33, pp. 6-25. [Abstract in Rev. Appl. Ent. (A) 10: 10-11. 1922.]

Nicotine proved generally effective against capsids on apples.

CRAWFORD, H. G.

(891)

1916. A CAPSID ATTACKING APPLES NEUROCOLPUS NUBILIS SAY. Ent. Soc. Ont. Ann. Rept. 46 (1915): 79-88, illus. [Abstract in Rev. Appl. Ent. (A) 4: 521-522. 1916.]

A spray consisting of Black Leaf 40, 1 part in 800 of water with 2 lb. soap to every 40 gal., should be applied when the nymphs are sufficiently abundant. This treatment may be repeated after an interval of 2 weeks.

BRITTON, W. E.

(892)

1918. INSECTS ATTACKING THE POTATO CROP IN CONNECTICUT. Conn. Agr. Expt. Sta. Bull. 208 (Ent. Ser. No. 26), pp. 103-119. [Abstract in Rev. Appl. Ent. (A) 7: 338. 1919.]

The potato aphid Macrosiphum solanifolii Ashm. and the four lined leaf bug Poecilocarsus lineatus F. may be controlled with nicotine and soap solution or kerosene emulsion.

REINHARD, H. J.

(893)

1927. CONTROL AND SPRING EMERGENCE OF THE COTTON FLEA HOPPER. Tex. Agr. Expt. Sta. Bull. 356, 32 p., illus. [Abstract in Rev. Appl. Ent. (A) 15: 533. 1927.]

A dust consisting of 60 parts superfine dusting sulphur, 20 parts finely ground tobacco dust, and 20 parts hydrated lime, and sulphur-tobacco dust (60 to 40) killed from 68 to 75 percent of the cotton flea hoppers treated and used at the rate of 20 lb. per acre remained effective for 6 or 7 days under favorable climatic conditions. The sulphur tobacco dust was the most effective.

REINHARD, H. J., and OWEN, W. J., JR.

(894)

1928. INVESTIGATIONS ON CONTROL OF THE COTTON FLEA HOPPER IN 1927. Tex. Agr. Expt. Sta. Bull. 380, 27 pp., illus.

Control experiments were conducted on half-acre plats in cotton fields infested with the flea hopper (Psallus seriatus), using "L" grade tobacco dust and sublimed velvet flowers of sulphur. No satisfactory control was secured by the tobacco dust (p. 26).

EWING, K. P.

(395)

1931. CAGE TESTS OF THE EFFECTIVENESS OF INSECTICIDAL DUSTS FOR THE CONTROL OF THE COTTON FLEA HOPPER. Jour. Econ. Ent. 24: 821-827, illus. [Abstract in Rev. Appl. Ent. (A) 19: 670. 1931.]

Preliminary tests indicated that dusts containing 4 percent nicotine were very effective in killing both adults and nymphs of Psallus seriatus Reut., whereas those containing 2.5 percent were considerably less effective.

FRYER, J. C. F.

(896)

1916. CAPSID BUGS. Jour. Bd. Agr. London 22 (10): 950-958, illus. [Abstract in Rev. Appl. Ent. (A) 4: 107-108. 1916.]

The best spraying fluids are nicotine and soap. In America, Black Leaf 40 has been found most effective. The species found in England include the green capsids, Plesiocoris rugicollis and Orthotylus marginalis, and the brown capsids, Psallus ambiguus and Atractotomus mali.

WARBURTON, C.

(897)

1917. ANNUAL REPORT OF THE ZOOLOGIST FOR 1917. Jour. Roy. Agr. Soc. England 78: 209-219. [Abstract in Rev. Appl. Ent. (A) 6: 435-436. 1918.]

The apple capsid bug (Plesiocoris rugicollis) was held in check by two sprayings of nicotine and soft soap.

FETHERBRIDGE, F. R.

(898)

1918. THE CONTROL OF THE APPLE CAPSID BUG BY SPRAYING. Jour. Bd. Agr. 24 (12): 1401-1410, illus. [Abstract in Rev. Appl. Ent. (A) 6: 238. 1918.]

An effective spray against the apple capsid bug (Plesiocoris rugicollis) is 10 lb. soap (more for hard water) and 7-8 oz. nicotine to 100 imperial gal. water. The best time for spraying is usually about a week before blossoming.

-----, and HUSAIN, M. A.

(899)

1918. A STUDY OF THE CAPSID BUGS FOUND ON APPLE TREES. Ann. Appl. Biol. 4 (4): 179-205, illus. [Abstract in Rev. Appl. Ent. (A) 6: 278-280. 1918.]

Plesiocoris rugicollis in all stages except the eggs, is quickly killed by 1 percent soft soap and 0.05 percent nicotine (98-99 percent). The spray should be applied just after all the bugs have hatched. A high pressure pump and a fairly coarse nozzle should be used. The trees should be thoroughly drenched in a downward direction.

SMITH, K. M.

(900)

1920. THE INJURIOUS APPLE CAPSID (PLESIOCORIS RUGICOLLIS FALL.). Jour. Min. Agr., London 27 (4): 379-381. [Abstract in Rev. Appl. Ent. (A) 8: 404-405. 1920.]

A formula that has proved satisfactory is nicotine (98-99-percent) 3 oz., soft soap 4 lb., and water 40 gal. This wash is expensive, but less efficient sprays are a waste of labor against capsids, while nicotine and soap will kill aphids, apple sucker (Psylla mali), and a good proportion of any winter moth (Cheimatobia brumata) caterpillars that may be present.

ROSTRUP, S., and THOMSEN, M.

(901)

1923. CONTROL OF BUGS ON APPLE TREES AND CONTRIBUTIONS TO THEIR LIFE-HISTORIES. Tidsskrift for Planteavl 29: 396-461, illus. [In Danish with a summary in English. Abstract in Rev. Appl. Ent. (A) 11: 579-580. 1923.]

Spraying operations against capsids (Plesiocoris rugicollis and Lygus pabulinus) on apples was most satisfactory when a spray, containing 0.1 percent nicotine and 1 percent soap, with an addition of 0.2 percent lead arsenate on account of a preceding attack of Cheimatobia brumata, was used just before the blossoming.

PETHERBRIDGE, F. R., and KENT, W. G.

(902)

1926. THE CONTROL OF THE APPLE CAPSID BUG. Jour. Min. Agr. [Gr. Brit.] 33 (1): 50-57. [Abstract in Rev. Appl. Ent. (A) 14: 303. 1926.]

The apple capsid Plesiocoris rugicollis Fall. can be effectively controlled by the proper application of soft soap and nicotine sprays. Application of 3 1/4 oz. nicotine (95-98 percent) and 4 lb. soft soap in 40 imperial gal. rainwater gave 60-80 percent unmarked fruit as compared to 4-31 percent on unsprayed plots. Sodium caseinate, 4/5 pt., was substituted for the soft soap in hard water with equally good results. Particularly good results were obtained with the following spray: sodium caseinate 4/5 pt., nicotine (40-45 percent) 7 1/2 oz., lead arsenate 2 lb., lime sulphur 1 gal., and hard water 39 imperial gals. The soap sprays wet the trees more easily than the caseinate ones, which take a little longer to apply, requiring rather more liquid per tree. Dusting with 1 or 2 percent nicotine or nicotine sulphate did not give satisfactory results.

STANILAND, L. N.

(903)

1926. EXPERIMENTS ON THE CONTROL OF THE APPLE CAPSID BUG (PLESIOCORIS RUGICOLLIS, Fieb.) Jour. Pomol. & Hort. Sci. 5 (4): 267-274. [Abstract in Rev. Appl. Ent. (A) 16: 423. 1928.]

Two percent oil sprays gave good results, and a wash composed of 8 oz. of 98-percent nicotine to 100 gal. of water with sufficient soap to allow of 1 percent free soap was also successful.

FRYER, J. C. F.

(904)

1929. THE CAPSID PESTS OF FRUIT TREES IN ENGLAND. 4th Internatl. Cong. Ent., Ithaca, Trans. 1928, 2: 229-236. [Abstract in Biol. Abs. 5 (2): 532. Entry 5,160. 1932.]

The two species of bugs (Plesiocoris rugicollis Fall. and Lygus pabulinus L.) can be controlled fairly satisfactorily by nicotine insecticides.

AUSTIN, M. D.

(905)

1930. FIELD EXPERIMENTS ON THE CONTROL OF THE APPLE CAPSID (PLESIOCORIS RUGICOLLIS FALL.) AND THE COMMON GREEN CAPSID (LYGUS PABULINUS LINN.) DURING 1929. Jour. S. E. Agr. Col. No. 27, pp. 147-179, illus. [Abstract in Rev. Appl. Ent. (A) 18: 625-626. 1930.]

P. rugicollis on apples was not successfully controlled by nicotine dusts or nicotine sprays. More than two applications are necessary to insure commercial control. Nicotine dusts and a nicotine soft-soap spray proved to be of value for the control of L. pabulinus, but to be effective treatment should be carried out at least twice and sometimes three times.

SCHOEVERS, T. A. C.

(906)

1930. APPLE BUGS AND THEIR CONTROL. Tijdschr. Plantenz. 36 (4): 75-83, illus. [In Dutch. Abstract in Rev. Appl. Ent. (A) 18: 514. 1930.]

A spray of nicotine and soap proved effective against the bug Plesiocoris rugicollis Fall.

PETHERBRIDGE, F. R., and HEY, G. L.

(907)

1931. WINTER SPRAYING FOR THE CONTROL OF THE APPLE CAPSID BUG PLESIOCORIS RUGICOLLIS. Jour. Min. Agr. [Gr. Brit.] 37 (11): 1078-1087. [Abstract in Biol. Abs. 7 (4): 920. 1933. Entry 8,998.]

Summer spraying in England with 5 lb. soft soap and 4 oz. nicotine (95-98 percent) in 40 gal. water gave a control as good as that obtained with the Long Ashton wash (10 or 12 percent).

COTTERELL, G. S.

(908)

1930. THE OCCURRENCE OF SAHLBERGELLA SPP. AND OTHER PESTS OF CACAO IN FERNANDO POO, SAN THOME AND THE BELGIAN CONGO. Dept. Agr. Gold Coast, Oct. Bull. 20 (Pap. 2d Conf. W. Afr. Agr. Off. Gold Coast, Oct. 1929), pp. 162-191. [Abstract in Rev. Appl. Ent. (A) 19: 189-191. 1931.]

No remedial measures are applied for the capsids (Sahlbergella), although a nicotine sulphate spray has been found successful, but its use is too expensive to be practical.

BREDO, H. J.

(909)

1931. CONTRIBUTION À L'ÉTUDE DE SAHLBERGELLA SINGULARIS HAGL. Bull. Agr. Congo Belge 22 (1): 81-98, illus. [Abstract in Biol. Abs. 7 (5): 1163. Entry, 11,448. 1933.]

Sprays with a nicotine base are useless against the adults of this bug.

2. Lace Bugs or Tingids (Tingididae), 1914-1933

MOZNETTE, G. F.

(910)

1922. THE AVOCADO. ITS INSECT ENEMIES AND HOW TO COMBAT THEM. U. S. Dept. Agr. Farmers' Bull. 1261, 31 pp., illus. [Abstract in Rev. Appl. Ent. (A) 10: 596. 1922.]

For the control of the avocado lace-bug (Acysta perscae Heid.) nicotine sulphate (40-percent) at 1 to 900 with 1-2 lb. fish-oil soap to each 50 gal. of diluted spray is suggested.

WADE, O.

(911)

1917. THE SYCAMORE LACE-BUG (CORYTHUCHA CILIATA SAY). Okla. Agr. Expt. Sta. Bull. 116, 16 pp., illus. [Abstract in Rev. Appl. Ent. (A) 6: 102. 1918.]

Experiments with nicotine sulphate, lime-sulphur, and kerosene emulsion, gave unsatisfactory results.

WELLHOUSE, W. H.

(912)

1919. LACE BUG ON HAWTHORN, CORYTHUCHA BELLULA, GIBSON (TINGIDIDAE, HEMIPTERA). Jour. Econ. Ent. 12: 441-446, illus. [Abstract in Rev. Appl. Ent. (A) 8: 77-78. 1920.]

Should the nymphs of the second brood become too numerous, they may be controlled by one of the nicotine sprays in use against leaf bugs on apple.

THOMPSON, B. G., and KWAN LUN WONG.

(913)

1933. WESTERN WILLOW TINGID, CORYTHUCHA SALICATA GIBSON, IN OREGON. [Jour. Econ. Ent. 26: 1090-1095, illus.]

Black leaf 40 alone, and combined with ammonium caseinate oil emulsion, was used. In the first tests not more than half of the tingids sprayed were killed, but later almost 100 percent of the nymphs were killed.

BATHELIER, J.

(914)

1925. OBSERVATIONS SUR UN INSECTE PARASITE DU POIVRIER. Bull. Econ. Indochine 28 (170): 67-72. [Abstract in Rev. Appl. Ent. (A) 13: 361. 1925.]

Frequent spraying with nicotine is recommended for the control of the tingid Elasmognathus nepalensis Dist on the pepper vine Piper nigrum.

FRAPPA, C.

(915)

1931. ON TWO HEMIPTEROUS INSECTS INJURIOUS TO COFFEE IN MADAGASCAR. Agron. Colon., No. 162, pp. 166-167. [In French. Abstract in Rev. Appl. Ent. (A) 19: 599. 1931.]

An insecticide that gave good results against the tingid Galeatus involutus Drake consists of 50 lbs. of debris of dry tobacco leaves steeped for 48 hours in 100 gal. of water and filtered through muslin, to which is added just before use 1 gal. methylated spirit, 8 lb. soap. and 2 lb. sodium carbonate.

FINK, D. E.

(916)

1915. THE EGGPLANT LACE-BUG. U. S. Dept. Agr. Bull. 239, 7 pp., illus.

A spray solution, consisting of 40-percent nicotine sulphate (1 to 640) and fish-oil soap (1 lb. to 50 gal.), killed from 85 to 90 percent of the nymphs, but none of the adult lace-bugs Gargaphis solani Heidemann. Soap solution (1 lb. to 50 gal.) alone killed 100 percent of the nymphs and 95 percent of the adults (p. 7).

LESNE, P.

(917)

1914. LES INSECTES NUISIBLES AUX ARBRES FRUITIERS. Jour. Agr. Prat. 78 (t. 27): 534-535.

The hemipteron Tingis pyri F. on pear trees should be fumigated with tobacco. Waste tobacco leaves may be burned or tobacco juice may be heated on red-hot plates under the infested trees, which must be covered with a tent.

DURANTE, D.

(918)

1917. CONTRIBUTION TO THE BIOLOGICAL KNOWLEDGE OF TINGIS PYRI F. Ann. Reg. Scuola Super. Agr. Portici 2d Ser. 14: 1-11. [In Italian.]

Against the above bug on pear trees the agrarian entomologists in Italy recommend the following spray mixture: 1 part phenicated tobacco extract, 1 part soft soap, and 100 parts water (p. 9).

LECAILLON, A.

(919)

1919. SUR LA BIOLOGIE DU TIGRE DU POIRIER (TINGIS PYRI GEOFFROY). Bull. Soc. Étude Vulg. Zool. Agr. 18 (7): 73-77. [Abstract in Rev. Appl. Ent. (A) 7: 500. 1919.]

Pears and apples were severely attacked by Stephanitis (Tingis) pyri Geoffr. The only possible remedy is the use of contact insecticides or fumigation with nicotine or hydrocyanic acid.

RIVIERE, G.

(920)

1921. THE TIGER (TIGRE) OF THE PEAR TREE. Jour. Soc. Nat. Hort. France 22: 403-403. [In French. Abstract in Rev. Appl. Ent. (A) 10: 170. 1922.]

Tobacco juice, even in weak solutions, has given good results provided the jet is directed upward so as to reach the bugs (Stephanitis (Tingis) pyri) on the lower surface of the leaves.

TROUVELOT, B.

(321)

1923. THE "TIGER" OF PEAR TREES. Cul. Fruitières, No. 4, p. 65-66, illus. [In French. Abstract in Rev. Appl. Ent. (A) 11: 480. 1923.]

Insecticides containing nicotine are of most value against the pear tingid (Stephanitis pyri Geoffr.).

CORNELI, E.

(922)

1927. OBSERVATIONS AND INVESTIGATIONS ON STEPHANITIS PYRI IN UMBRIA. Curiamo le piante 1927. Reprint No. 11-12. 7 pp. [In Italian. Abstract in Rev. Appl. Ent. (A) 16: 291-292. 1928.]

Dusting with tobacco proved unsatisfactory against Stephanitis (Tingis) pyri F. The best results were given by a solution containing 1 percent phenicated tobacco extract and 1 percent soft soap. One application at the end of June destroyed nearly all the larvae and nymphs though some of the more active adults escaped.

UGRYUMOV, G. D., and VUISHELESSKAYA, N. S.

(923)

1931. INSECTICIDE ACTION OF NICOTINE PREPARATIONS. Bull. Plant-Prot. 3 (1): 115-145. [In Russian with a summary in English. Abstract in Rev. Appl. Ent. (A) 20: 197-198. 1932.]

Sprays of nicotine sulphate and various extracts of tobacco obtained from different parts of Russia were tested at equivalent concentrations of actual nicotine against Stephanitis (Tingis) pyri F., Psylla pyri L., and various aphids. Laboratory tests showed that 40-percent nicotine sulphate and some of the extracts were about twice as effective as others or as chemically pure nicotine. In the case of the extracts, it was found that this does not depend on differences in hydrogen-ion concentration. In field tests the various preparations at a concentration of 0.05 percent actual nicotine were much less effective when used alone than when combined with soap at the rate of 1 lb. to 24 gal. With or without the addition of soap, nicotine sulphate was more effective than the extracts, whereas the lowest rate of mortality was produced by 95-98 percent nicotine. When, however, soft water was used, the toxicity of the latter was higher than that of the extracts.

RITZEMA, BOS J.

(924)

1915. DISEASE AND DAMAGE CAUSED BY ANIMALS. Meded. R. Hoogere Land. Tuin en Boschbouwsch. Wageningen 8 (5): 301-331. [In Dutch. Abstract in Rev. Appl. Ent. (A) 3: 740-744. 1915.]

Spraying with tobacco will kill the larvae of Rhynchoa (Tingis) rhododendri, Horv., but a watch should be kept for adults and spraying repeated to kill the larvae from eggs laid by them.

MARCHAL, P.

(925)

1917. LE TIGRE DU RHODODENDRON (STEPHANITIS RHODODENDRI HORV.) Bull. P. th. Vég. France 4 (2): 93-95.

Nicotine solutions of the usual strength are recommended against this tinging in France, but in Holland the best spray mixture used against it consists of nicotine, plus 2 percent soap and 1 percent wood alcohol. The fumigation of tobacco under a tent can equally be recommended.

FRON, M. G.

(926)

1918. NOTE ON STEPHANITIS RHODODENDRI. Jour. Soc. Nat. Hort. France 19 (4) 91-93. 1918. [In French. Abstract in Rev. Appl. Ent. (A) 6: 443. 1918.]

Remedial measures include nicotine spray, or soap and pyrethrum, which must be applied to the lower surface of the leaves. Tobacco fumigation under a tent is also recommended.

MARCHAL, P., and FOEX, E.

(927)

1921. RAPPORT PHYTOPATHOLOGIQUE POUR LES ANNÉES 1919-1920. Ann Éphyties 7 (1919 and 1920): i - lxxxvii. [Abstract in Rev. Appl. Ent. (A) 10: 265-267. 1922.]

Stephanitis rhododendri Horv. attacking ornamentals can be successfully treated by nicotine sprays soon after hatching of the eggs.

ANONYMOUS

(928)

1922. THE RHODODENDRON BUG (LEPTOBYRSA (STEPHANITIS) RHODODENDRI HORV.) Jour. Minist. Agr. 29 (6): 555-558, illus. [Abstract in Rev. Appl. Ent. (A) 10:554. 1922.]

A soap wash consisting of 1 lb. soft soap in 10 imperial gal. of water is effective against this tinging (rhododendron bug) but the addition of 1 fl. oz. of 95-98 percent nicotine in each 10 gal. of the above spray renders it more effective.

HOARE, A. H.

(929)

1923. THE RHODODENDRON BUG STEPHANITIS (LEPTOBYRSA) RHODODENDRI HORVATH AND A REPORT UPON EXPERIMENTS WITH VARIOUS INSECTICIDES. Jour. R. Hort. Soc. 48 (1): 16-21. [Abstract in Rev. Appl. Ent. (A) 11: 204. 1923.]

A wash with a good standard potash soap alone is thoroughly effective, the addition of nicotine giving no better results.

LEONARD, M. D., and MILLS, A. S.

(930)

1931. OBSERVATIONS ON THE BEAN LACE-BUG IN PORTO RICO. Puerto Rico Dept. Agr. Jour. 15 (3): 309-323, illus. [Abstract in Rev. Appl. Ent. (A) 20: 59-60. 1932.]

A review of the literature on the use of sprays for the control of tingids shows that nicotine sulphate is comparatively ineffective.

3. Chinch Bug and Other Lygaeids (Lygaeidae), 1913-1933

HEADLEE, T. J., and MCCOLLOCH, J. W.

(931)

1913. THE CHINCH BUG (BLISSUS LEUCOPTERA SAY). Kans. Agr. Expt. Sta. Bull. 191, pp. 287-353, illus. [Abstract in Rev. Appl. Ent. (A) 2: 226-238. 1914.]

Infested corn and sorghum plants are sprayed with kerosene emulsion, or better still with a solution of whale-oil soap or a decoction of Black Leaf 40 (p. 228).

HUDSON, H. F.

(932)

1913. THE CHINCH BUG IN ONTARIO. Ent. Soc. Ont. Ann. Rept. pp. 46-50, illus. [Abstract in Rev. Appl. Ent. (A) 1: 401-402. 1913.]

Corn may be protected against Blissus leucoptera by spraying with a solution made by dissolving 2 oz. soft soap in 1 gal. of nearly boiling water and then adding 1/2 oz. Black Leaf 40.

FORBES, S. A.

(933)

1916. THE CHINCH-BUG OUTBREAK OF 1910 to 1915. Ill. Agr. Expt. Sta. Circ. 189, 59 pp., illus.

A general spraying of the young corn, bearing chinch bugs, with Black Leaf 40 (1/4 oz. to a gal. soap solution) saved the crop in many fields at a comparatively trifling expense (p. 39).

Spraying tests in wheat fields often killed a high percentage of the bugs, but soap solutions alone were almost as good as the nicotine sprays (pp. 39-40).

SCHOLL, E. E.

(934)

1916. DIVISION OF ENTOMOLOGY. FIELD WORK. Tex., Conn. Agr. 9th Ann. Rept., pp. 11-15. [Abstract in Rev. Appl. Ent. (A) 6: 267-268. 1918.]

Against the chinch bug (Blissus leucopterus Say) one of the most successful sprays used was a mixture consisting of 1 lb. laundry soap, 100 gal. water, and 1/2 pt. nicotine sulphate. The nicotine-sulphate, one pint, and soap mixture was also efficacious against the melon aphid (Aphis gossypii).

GOSSARD, H. A.

(935)

1920. WATCH FOR CHINCH BUGS. METHOD OF CONSTRUCTING DUST AND TAR BARRIERS IN FARM FIELDS. Ohio Agr. Expt. Sta. Monthly Bull. 5 (6): 178-179. [Abstract in Rev. Appl. Ent. (A) 8: 504-505. 1920.]

Chinch bugs (Blissus leucopterus) in a corn field may be sprayed with nicotine sulphate (1:500) plus 4 lb. of soap per 100 gal. of water.

DAVIS, J. J.

(936)

1921. THE CHINCH BUG IN INDIANA. Purdue Univ. Dept. Agr. Ext. Bull. 99, 8 pp., illus. [Abstract in Rev. Appl. Ent. (A) 10: 197-198. 1922.]

For use against the immature chinch bugs (Blissus leucopterus) Black Leaf 40, 1 oz. or 2 tablespoonfuls, to 2 gal. of water in which 2 oz. laundry or fish-oil soap has been dissolved, is recommended.

WALLACE, F. W.

(937)

1921. REPORT OF THE DIVISION OF ENTOMOLOGY. Ind. Dept. Conserv. 2nd Ann. Rept. year ending 30th Sept. 1920, pp. 273-284. [Abstract in Rev. Appl. Ent. (A) 9: 337-338. 1921.]

To help control chinch bugs (Blissus leucopterus), infested corn should be sprayed with 3 lb. fish-oil soap, 1 pt. Black Leaf 40 or 1 1/2 pt. nicotine oleate, to 50 gal. water. The remedy that has proved successful against the oyster-shell scale (Lepidosaphes ulmi) is a spray of 1 lb. fish-oil soap to 4 gal. of water, adding 1 oz. of Black Leaf 40 to every 4 gal. of solution.

FLINT, W. P.

(938)

1923. CALCIUM CYANIDE FOR CHINCH BUG CONTROL. Jour. Econ. Ent. 16: 328. [Abstract in Rev. Appl. Ent. (A) 11: 415-416. 1923.]

Spent tobacco dust carrying 12 percent calcium cyanide killed about 95-98 percent of chinch bugs (Blissus leucopterus) within 3 inches of the point of application.

WILSON, R. N.

(939)

1929. THE CHINCH BUG IN RELATION TO ST. AUGUSTINE GRASS. U. S. Dept. Agr. Circ. 51, 6 pp., illus. [Abstract in Rev. Appl. Ent. (A) 17: 517. 1929.]

In addition to the use of calcium cyanide, the author recommends the application of 1 lb. common laundry soap to 50 gal. water, or 1 part 40-percent nicotine to 800 parts water, with 1 lb. soap to 25 gal. These insecticides, however, have no effect on the eggs of the chinch bug (Blissus leucopterus Say.)

FELT, E. P.

(940)

1933. CHINCH BUG (ELISSUS LEUCOPTERUS SAY). Jour. Econ. Ent. 26 (5):
994. [Abstract in Rev. Appl. Ent. (A) 21: 659. 1933.]

Repeated applications of a contact insecticide, such as a combination of potassium oleate and nicotine sulphate, or dusts of tobacco or of nicotine sulphate and lime, kill a portion of the bugs, but do not affect the eggs.

VEITCH, R.

(941)

1926. AN IMPORTANT QUEENSLAND INSECT PEST. Queensland Agr. Jour. 26
(5): 385-386, illus. [Abstract in Rev. Appl. Ent. (A) 15: 132. 1927.]

Nicotine sulphate and kerosene emulsion sprays do not satisfactorily control a lygaeid (Nysius sp.)

MILLIKEN, F. B.

(942)

1916. THE FALSE CHINCH-BUG AND MEASURES FOR CONTROLLING IT. U. S.
Dept. Agr. Farmers' Bull. 762, 4 pp., illus. [Abstract in Rev. Appl.
Ent. (A) 5: 145. 1916.]

For the control of the false chinch bug (Nysius ericae Schill.) on turnips and radishes 1 lb. of soap to 10 gal. water plus nicotine sulphate (1:1,000) may be used.

LANGFORD, G. S.

(943)

1925. NOTES ON THE FALSE CHINCH BUG, NYSIUS ERICAE SCHILL. Colo.
State Ent. 16th Ann. Rept. 1924. Cir. 47, pp. 24-25, illus.

Nicotine sulphate (1 pt. to 10 gal. soap solution) was unsatisfactory against this bug on horseradish, and nicotine dust killed only 20 to 50 percent of them on horseradish and turnips.

MORRILL, A. W.

(944)

1916. REPORT OF THE ENTOMOLOGIST OF THE ARIZONA COMMISSION OF
AGRICULTURE AND HORTICULTURE. Ariz. Com. Agr. & Hort. 8th Ann. Rept.,
1916, pp. 11-57, illus. [Abstract in Rev. Appl. Ent. (A) 5: 314-316.
1917.]

For the control of the false chinch bug (Nysius minutus Uhl.) on vegetable crops, nicotine sulphate and whale-oil soap solution is recommended.

DEGRULLY, L.

(945)

1924. UN ENNEMI ACCIDENTEL DE LA VIGNE. Prog. Agr. et Vitic. 82: 81-82.

A spray, consisting of 0.1 g. of pure nicotine per l. of water, was ineffective against Nysius senecionis on grape vines in France.

FRENCH, C. JR.

(946)

1918. THE RUTHERGLEN BUG (MYSIUS VINITOR). A DESTRUCTIVE PEST TO POTATOES, TOMATOES, GRAPES, PEACHES, ETC. Victoria Dept. Agr. Jour. 16 (12): 733-740, illus. [Abstract in Rev. Appl. Ent. (A) 7: 199-200. 1919.]

Recommendations for remedial measures include the use of benzol emulsion (1 lb. to 5 gal. water), kerosene, or tobacco sprays.

GURNEY, W. B.

(947)

1924. INSECT PESTS OF THE PRESENT SEASON. Agr. Gaz. N. S. Wales. 35 (1): 69-71. [Abstract in Rev. Appl. Ent. (A) 12: 149. 1924.]

Where the rutherghlen bug Mysius vinitor Bergr. appears in serious numbers it may be necessary to spray with kerosene emulsion or nicotine sulphate or a mixture of both.

NEWMAN, L. J.

(948)

1931. THE PRINCIPAL INSECT PESTS OF TOBACCO. W. Aus. Dept. Agr. Jour. (2) 8 (4): 520-541, illus. [Abstract in Rev. Appl. Ent. (A) 20: 245-246. 1932.]

Various nicotine sprays may be used for the control of the bug Mysius vinitor Bergr. Against Halotydaeus destructor Tuck. nicotine sulphate and soap may be used for spraying or for immersing seedlings before planting out.

SCHOLL, G. J., and STEPHENS, J. C.

(949)

1925. STRAWBERRY, BLACKBERRY AND DEWBERRY CULTURE IN EAST TEXAS. Tex. Dept. Agr. Bull. 84, 31 pp., illus. [Abstract in Rev. Appl. Ent. (A) 15: 590-591. 1927.]

The bug Orthaea vincta Say and Thrips tabaci may be controlled by using 40-percent nicotine sulphate and soap.

BOLLE, P. C., and STAMMESHAUS, L.

(950)

1929. INVESTIGATIONS ON THE BIOLOGY AND CONTROL OF PHAENACANTHA SACCHARICIDA. Arch. Suikerind. Ned.-Indie 1929, p. 459-504. (Meded. Proefst. Java-Suikerind. 1929, No. 7.) [Abstract in Rev. Appl. Ent. (A) 17: 303. 1929.]

For the control of the lygaeid Phaenacantha (colobathristes) saccharicida Karsch, weeds near the field should be burned or treated with a spray of tobacco and soap or calcium cyanide dust. These insecticides may also be used on young cane and against bugs hiding on the ground.

MOZETTE, G. F.

(951)

1921. NOTES ON THE ROYAL PALM BUG. Fla. State Plant Bd. Quart. Bull. 6 (1): 10-12, illus. [Abstract in Rev. Appl. Ent. (A) 10: 120. 1922.]

The remedial measure recommended for the control of the lygaeid Xylostodorus luteolus Barber is spraying with nicotine sulphate (40-percent) at 1 to 1,200 plus fish-oil soap, 5 lb. to 125 gal. Two applications should be made, with a week's interval.

BRUNER, S. C.

(952)

1924. NOTES ON THE BUG ATTACKING ROYAL PALMS. Rev. Agr. Comm. Trabajo 7 (3): 27-28. [Abstract in Rev. Appl. Ent. (A) 13: 89. 1925.]

A spray of nicotine sulphate and soap may be applied for the control of the lygaeid Xylostodorus luteolus Barber causing withering of the leaves of the royal palm (Oreodoxa regia).

4. Squash Bug and Other Coreids (Coreidae), 1913-1933

REED, W. V.

(953)

1915. SOME OF THE MORE IMPORTANT TRUCK CROP PESTS IN GEORGIA. Ga. State. Bd. Ent., Bull. 41, 39pp., illus. [Abstract in Rev. Appl. Ent. (A) 3: 471-472. 1915.]

Spraying with 40-percent nicotine sulphate at the rate of 1 part to 300 killed the nymphs of the squash bug (Anasa tristis). Aphids (Aphis gossypii and A. brassicae) were controlled with Black Leaf 40.

MUMFORD, F. B.

(954)

1917. HOW THE STATION WORKS. Miss. Agr. Expt. Sta. Bull. 151, 68 pp. [Abstract in Rev. Appl. Ent. (A) 6: 126-127. 1918.]

Nicotine killed the young nymphs of the squash stink bug (Anasa tristis) but merely stupefied the adults.

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(955)

1920. WORK AND PROGRESS OF THE AGRICULTURAL EXPERIMENT STATION FOR THE YEAR 1ST JULY 1918 to 30TH JUNE 1919. Mo. Agr. Expt. Sta. Bull. 172, 48 pp., illus. [Abstract in Rev. Appl. Ent. (A) 9: 239. 1921.]

The melon aphid (Aphis gossypii) can be controlled by spraying with nicotine sulphate; this spray also gave the best results against the squash stink-bug (Anasa tristis).

WADLEY, F. M.

(956)

1920. THE SQUASH BUG. Jour. Econ. Ent. 13: 416-425.

Black Leaf 40 (1 to 250, 1 to 500, and 1 to 1,000 in soap solution) killed from 85 to 100 percent of the squash bugs (Anasa tristis DeG.) sprayed in the laboratory, but in the field from 57 to 83.5 percent.

WORTHLEY, H. N.

(957)

1923. THE SQUASH BUG IN MASSACHUSETTS. Jour. Econ. Ent. 16: 73-79, illus. [Abstract in Rev. Appl. Ent. (A) 11: 225. 1923.]

No satisfactory measure has yet been found against Anasa tristis DeG., though of the substances tried nicotine sulphate dust would appear to give the most promising results.

HOUSER, J. S.

(958)

1926. PUMPKIN INSECTS. Canner 62 (10) (convention no., pt. 2) : 133-134. [Abstract in Rev. Appl. Ent. (A) 14: 354. 1926.]

For the control of Anasa tristis DeG. under field conditions 40-percent nicotine sulphate (1:400) may be applied to the lower surface of the leaves against the newly hatched nymphs.

LITTLE, V. A.

(959)

1927. CALCIUM CYANIDE FOR THE CONTROL OF THE SQUASH BUG ANASA TRISTIS DEGEER. Jour. Econ. Ent. 20: 575-577. [Abstract in Rev. Appl. Ent. (A) 16: 80. 1928.]

Efforts to control the bugs with 2-percent and 4-percent nicotine dust were unsuccessful. Over 80 percent control of both nymphs and adults was obtained with undiluted cyanogas calcium cyanide "A" dust.

KNOWLTON, G. F.

(960)

1933. INSECT PESTS IN UTAH. Utah Agr. Expt. Sta. Leaflet Nos. 2 & 4, illus. [Abstract in Rev. Appl. Ent. (A) 21: 589; 22: 68. 1934.]

A spray of 40-percent nicotine sulphate (1 : 400) or of 8 oz. nicotine sulphate and 4 lb. soft soap in 25 gal. water will give good control of the nymphs of squash bugs (Anasa tristis DeG.) that are covered with the liquid (leafl. no. 2).

Against leafhoppers (Erythroneura comes var. ziczac Walsh and var. elegans McAtee), the plants may be treated before serious damage has been caused with a spray containing nicotine sulphate (leafl. no. 4).

ANONYMOUS

(961)

1923. MISCELLANEOUS ENTOMOLOGICAL NOTES. Farming in S. Africa 1 (1):
23. [Abstract in Rev. Appl. Ent. (A) 15: 327-230. 1927.]

A coreid [Acanthomia tomentasicollis Stål (bean bug)] feeding on bean pods was sprayed with 1 part tobacco extract (nicotine=7 percent) to 50 parts water. This killed the nymphs in a few minutes and the adults in 2-6 hours.

VANDENBERG, S. R.

(962)

1929. REPORT OF THE ENTOMOLOGIST. Guam Agr. Expt. Sta. Ann. Rpt. 1927, pp. 12-17. [Abstract in Rev. Appl. Ent. (A) 17: 604-605. 1929.]

Leptoglossus sp. attacking cucurbits in the southern part of the island was successfully controlled by spraying with a solution made by macerating and steeping 4 lb. of tobacco refuse in 1 gal. of water. The spray killed the eggs and nymphs and seemed to be repellent to the adults.

MONTE, O.

(963)

1932. PESTS OF GOURDS. Bol. Agr. Zootec./Minas Gerais 5 (4): 65-69, illus. [In Portuguese. Abstract in Rev. Appl. Ent. (A) 21: 663. 1933.]

A spray of nicotine and soap is effective against Aphis gossypii Glov., and the coreid bug Leptoglossus gonagra F.

(964)

1932. A BUG SUCKING TOMATO, PHTHIA PICTA DRURY. Chacaras e Quintaes 45 (2): 222-224, illus. [In Portuguese. Abstract in Rev. Appl. Ent. (A) 20: 324. 1932.]

This coreid bug occurs on tomatoes in the State of Minas, Brazil. The best control measure consists in spraying with nicotine and soap.

5. Pentatomid Bugs (Pentatomidae) and Other Heteroptera,
1912-1933.

SWENK, M. H.

(965)

1920. THE HARLEQUIN CABBAGE BUG. Neb. State Ent. Bull. 10, 3 pp., illus. [Abstract in Rev. Appl. Ent. (A) 9: 426. 1921.]

As regards this bug (Murgantia histrionica), a 10-percent kerosene emulsion will destroy the nymphs; against the adults a spray consisting of 1 pt. nicotine sulphate to 25 gal. of water (1 to 200) and 4 lb. of soap may produce good results.

WALKER, H. G., and ANDERSON, L. D.

(966)

1933. REPORT ON THE CONTROL OF THE HARLEQUIN BUG, MURGANTIA HISTRIONICA MAHN, WITH NOTES ON THE SEVERITY OF AN OUTBREAK OF THIS INSECT IN 1932. Jour. Econ. Ent. 26 (1): 129-135. [Abstract in Rev. Appl. Ent. (A) 21: 239-240. 1933.]

In general, nicotine, pyrethrum, and oil emulsion sprays were not effective against the adults except at very strong concentrations.

TOTHILL, J. D.

(967)

1929. A RECONNAISSANCE SURVEY OF AGRICULTURAL CONDITIONS IN THE BRITISH SOLOMON ISLAND PROTECTORATE. F'scap fol., 17 pp., Suva, Fiji. [Abstract in Rev. Appl. Ent. (A) 17: 416-417. 1929.]

A method of poisoning the larvae of the hispid Brontispa froggatti Sharp has been described, though a nicotine and soap solution is advocated in the present case. Tobacco and soap wash should also be applied to the cut surfaces of the trees. For the control of the pentatomid Axiagastus campbelli Dist., tobacco extract and soap might be applied by natives climbing to the tops of the palms and spraying with a small hand sprayer.

CHALOT, C., and BERNARD, U.

(968)

1918. CULTIVATION AND PREPARATION OF VANILLA. Agron. Colon. 3, (21) (Nov.-Dec.): 72-86. [in French. Abstract in Rev. Appl. Ent. (A) 7: 192-193. 1919.]

Nicotinated pyrethrum, hydrocyanic acid gas, and trap plants in the neighborhood of vanilla plantations have been recommended for the control of the pentatomid bug Memmia vicina.

STEFANI, T.

(969)

1923. PIEZODORUS INCARNATUS GERM. IN ORCHARDS. Ann. R. Staz. Spem. Agrum e Fruttio. 7: 37-42. [In Italian. Abstract in Rev. Appl. Ent. (A) 12: 343. 1924.]

Spraying with nicotine and soap or with tar oil and soda appears to be the most feasible remedial measure. These insecticides remain semi-liquid for some time, and their odor repels the bugs. This pentatomid bug infests the trunks of almonds and various fruits.

GUINN, D.

(970)

1918. THE BAGRADE BUG (BAGRADA HILARIS). Union S. Afr. Dept. Agr. Bull. 9, 16 pp., illus. [Abstract in Rev. Appl. Ent. (A) 7: 165. 1919.]

Turnip plants can be sprayed with crude carbolic acid emulsion (1:20) or with non-arsenical tobacco extract (1:16) plus 1 lb. soap.

PHIPPS, C. P.

(971)

1924. A STILT-BUG, JALYSUS SPINOSUS SAY., DESTRUCTIVE TO THE TOMATO.
Jour. Econ. Ent. 17: 390-393, illus. [Abstract in Rev. Appl. Ent.
(A) 12: 400. 1924.]

The nymphs of this neidid may be killed and the foliage protected from subsequent attack by the application of nicotine sulphate and Bordeaux mixture as soon as migration to the tomato is noticed. A second application should be made early in August when the majority of the first brood nymphs are present.

TRAYON, N. H.

(972)

1923. THE CITRUS BUG (ONCOSCELIS SULCIVENTRIS). Queensland Agr. Jour.
20 (3): 181-182. [Abstract in Rev. Appl. Ent. (A) 11: 572. 1923.]

Black Leaf 40 and resin plus kerosene emulsion have proved fatal when brought into contact with the above bug by spraying, although spraying is difficult, as the insects are scattered on the lower surfaces of the leaves.

KRISHNA AYYAR, P. N.

(973)

1930. A NOTE ON STIPAROPUS TABULATUS SCHIO. (HEM., PENT.) A NEW
PEST OF TOBACCO IN SOUTH INDIA. Bull. Ent. Res. 21 (1): 29-31.
[Abstract in Rev. Appl. Ent. (A) 18: 425. 1930.]

The bug, which attacks the roots of tobacco, could be almost completely destroyed without injury to the plants by applying crude oil emulsion in the proportion of 1 lb. in 6 gal. water mixed with a tobacco decoction (1 lb. soaked in 1 gal. of water all night and then diluted with an equal quantity of water). This was sufficient for about 80 plants.

EICHINGER.

(974)

1912. BEKÄMPFUNG DER KAFFEEWANZE. Pflanze 8: 312-316.

Several formulas were recommended against the coffee bug on coffee trees in tropical Africa. The following is one of the simplest: 600 g. tobacco leaves, 500 g. soft soap, and 20 l. water (p. 313).

WARD, J. M.

(975)

1923. CITRUS BUG CONTROL. Queensland Agr. Jour. [2]. 20: 328.

Against the bronze orange bug on citrus trees in Queensland the following spray mixture was found unsatisfactory: 1 oz. Black Leaf 40, 24 oz. resin, 12 oz. soda, and 6 gal. water.

H. THRIPS (THYSANOPTERA), 1877-1934

HORTON, J. R.

(976)

1915. CONTROL OF THE CITRUS THRIPS IN CALIFORNIA AND ARIZONA.

U. S. Dept. Agr. Farmers' Bull. 674, 15 pp., illus.

Against Acirtothrips (Euthrips) citri Moulton the following spray mixtures are recommended: (1) 1 part commercial lime-sulphur diluted with 86 parts water, then add 40-percent nicotine sulphate (1 to 1,000): (2) 40-percent nicotine sulphate (1 to 800). Tests with plain tobacco extracts without the addition of lime-sulphur or other preparations have given very good results when the tobacco has been used at sufficient strength.

GIRAULT, A. A.

(977)

1925. THE BANANA THRIPS RUST. Queensland Agr. Jour. 23 (6): 471-517, illus. [Abstract in Rev. Appl. Ent. (A) 13: 452-453. 1925.]

Most of the materials tried against Anaphothrips signipennis Bagn. except pyrethrum produced indifferent results. A strong solution of nicotine sulphate may be used as an alternative insecticide in strong kerosene-soap solution.

WATSON, J. R.

(978)

1913. AN UNUSUAL TYPE OF INJURY DUE TO A THRIP. Jour. Econ. Ent. 6: 413-414, illus. [Abstract in Rev. Appl. Ent. (A) 1: 512. 1913.]

Tobacco decoction kills the thrips Cryptothrips floridensis Watson, but it must be made stronger than for most species. For the adults the liquid now in use is made up of 1/2 gal. whale-oil soap, 1/2 gal. commercial lime-sulphur, 1/2 lb. Black Leaf 40, and 50 gal. water. This has proved efficient, but it does not kill the eggs nor the adults and larvae hidden under the bark.

YOTHERS, W. W., and MASON, A. C.

(979)

1924. THE CAMPHOR THRIPS. U. S. Dept. Agr. Bull. 1225, 29 pp., illus. [Abstract in Rev. Appl. Ent. (A) 12: 333-334. 1924.]

Spraying is only effective if applied when the thrips (Cryptothrips floridensis Wats.) are on the foliage in bright days, when all those hit may be killed by a solution of 1/2 lb. 40-percent nicotine sulphate, 2 qt. potash fish-oil soap, and 2 qt. lime-sulphur to 50 gal. water.

ANDERSON, T. J.

(980)

1917. NOTES ON INSECTS INJURIOUS TO COFFEE. Brit. E. Africa., Dept. Agr. Bull. 2, pp. 20-43. Nairobi. [Abstract in Rev. Appl. Ent. (A) 6: 15-16. 1918.]

A spray made by steeping 6 lb. tobacco leaf in 26 gal. water for 24 hrs, straining and mixing with 2 lb. soft soap was effective against Diarthrothrips coffeae Williams, but too expensive for use on a large scale.

SMEE, C.

(981)

1933. REPORT OF THE ENTOMOLOGIST. Nyasaland Dept. Agr. Rept. 1932, pp. 48-52. [Abstract in Rev. Appl. Ent. (A) 22: 119-121. 1934.]

An unusual outbreak of Diarthrothrips coffeae Will. on coffee was rapidly controlled by a nicotine spray. Triosa merwei Petzey, which sucks the cell sap from citrus leaves, can be controlled by repeated applications of soap or nicotine direct to the lower surface of the leaves under strong pressure.

MOULTON, D.

(982)

1928. THE GRAPE THRIPS (DREPANOTHRIPS REUTERI UZEL.). Calif. Dept. Agr. Monthly Bull. 17 (8): 455-457, illus.

Under favorable conditions reasonable results may be expected by dusting with a nicotine dust with not less than 6 percent nicotine sulphate.

Where growers have power spraying equipment, one of the following spray mixtures is recommended: (1) Highly refined oil emulsion 1.5 or 2 gal., with nicotine sulphate 1.5 pt., in 200 gal. water; or (2) light miscible oil 1.5 gal., nicotine sulphate 1.5 pt., together with atomic sulphur 20 lb. or dry wettable sulphur 10 lb., in 200 gal. water.

JONES, P. R., and HORTON, J. R.

(983)

1911. THE ORANGE THRIPS: A REPORT OF PROGRESS FOR THE YEARS 1909 and 1910. U. S. Dept. Agr. Bur. Ent. Bull. 99, Part I, 16 p., illus.

Black Leaf tobacco extract (2.75-percent nicotine) and Black Leaf "40" (40-percent nicotine) were used (p. 14).

This thrips (Euthrips citri Moulton) can be controlled by 4 sprayings of lime-sulphur solution combined with a commercial tobacco extract, which should be applied when the thrips become sufficiently numerous (p. 15).

BONDAR, G.

(984)

1924. TWO DISEASES OF THE LEAVES OF CASSAVA. II. THE "MOSAIC" PRODUCED BY THE THYSANOPTERON E. MANIHOTI SP. N. Chacaras e Quintaes 30 (3): 215-218. [Abstract in Rev. Appl. Ent. (A) 12: 590. 1924.]

Euthrips manihoti sp. n. causes spotting on the leaves of cassava. Washing all material that is to be planted in a solution of nicotine is advised.

CRAWFORD, D. L.

(985)

1915. POTATO CURLY LEAF. Calif. State Com. Hort. Monthly Bull. 4 (8): 389-391, illus. [Abstract in Rev. Appl. Ent. (A) 3: 688. 1915.]

It is suggested that 1 pt. tobacco extract to 100 gals. Bordeaux mixture be used to control Euthrips occidentalis. The first application should be made not more than a month after planting and the second about 3 weeks later.

THOMSEN, M.

(986)

1923. EUTHRIPS PARVUS, MOULTON, A NEW GREENHOUSE PEST. Ent. Med. 14 (2-3): 110-119, illus. [In German. Abstract in Rev. Appl. Ent. (A) 11: 319. 1923.]

In recent years the leaves of Begonia in Danish greenhouses have been attacked by the above thrips. Nicotine fumigation is effective against it.

MOULTON, D.

(987)

1909. THE PEAR THRIPS AND ITS CONTROL (EUTHRIPS PYRI DANIEL). U. S. Dept. Agr. Bur. Ent. Bull. 80, Part IV, pp. 51-66, illus.

A combination spray of Black Leaf tobacco extract (1 : 60) and 2 percent distillate-oil emulsion, or a spray of Black Leaf extract alone, should be used against the adults early in March, and against the larvae in April (p. 66).

FOSTER, S. W., and JONES, P. R.

(988)

1911. HOW TO CONTROL THE PEAR THRIPS (EUTHRIPS PYRI DANIEL). U. S. Dept. Agr. Bur. Ent. Circ. 131, 24 pp., illus.

Solutions of tobacco extract were very promising, and when used at sufficient strengths killed all the thrips actually reached, but they did not enter the swelling buds, where most of the injury is done inside the cluster buds (p. 7.)

A tobacco extract containing 2.75 percent nicotine, diluted at the rate 1 to 60 in a 6-percent distillate-oil emulsion, killed all the thrips touched and penetrated well into the pear cluster buds (p. 8).

WATSON, J. R.

(989)

1913. SPRAYING TOMATOES FOR THRIPS. Fla. Agr. Expt. Sta., Rept. 1912, lxi-lxii. [Abstract in Rev. Appl. Ent. (A) 1: 264. 1913.]

A trial strip was sprayed with the following: 5 1/3 gal. commercial lime-sulphur (33° Baumé), 14 fl. oz. Black Leaf 40, and 200 gal. water. It was estimated that 78 percent of the thrips (Euthrips tritici) were killed.

(990)

1922. THE FLOWER THRIPS. Fla. Agr. Expt. Sta. Bull. 162, pp. 27-51, illus. [Abstract in Rev. Appl. Ent. (A) 11: 196-197. 1923.]

Spraying is profitable in groves with an average of 25 thrips (Frankliniella bispinosa Morgan) to the blossom, the best insecticide being tobacco extract. Better results are obtained by the addition of a spreader consisting of 1 or 2 lb. of soap to 50 gal. or lime-sulphur (1 : 70). The best killing effects are obtained with 1 pt. (13 oz.) of Black Leaf 40 to 100 gal. of lime-sulphur (1 : 70). Instructions are also given for the preparation of tobacco extract from refuse tobacco. Tests were made with lime and nicotine sulphate dusts containing 2.2, 5, and 10 percent of nicotine sulphate. The weakest mixture gave as good results as the stronger ones. On roses the thrips may be destroyed by tobacco extract or a strong solution of soap as a spray.

(991)

1928. REPORT OF THE ENTOMOLOGIST. Fla. Agr. Expt. Sta. Rept. 1926-1927, pp. 43R-49R. [Abstract in Rev. Appl. Ent. (A) 17: 84-85. 1929.]

In regard to insects predacious on aphids, it is important to choose such insecticides as tobacco products, which do not kill many predators. Among many insecticides tried, two seem to be an improvement over the 3 percent nicotine sulphate and lime dust hitherto used. Fine tobacco dust, analyzing 2 percent nicotine (snuff no. 2), was also promising. Against the Florida flower thrips (Frankliniella tritici bispinosa Morg. nicotine sulphate (1 : 800) killed nearly 90 percent, but the best results were obtained with equal parts of sulphur and the snuff no. 2, which killed the thrips in blossom and acted as a repellent, delaying re-infestation for several days.

CHAMBERLIN, F. S.

(992)

1932. THE APPARENT INCOMPATIBILITY OF BARIUM FLUOSILICATE AND NICOTINE SULPHATE. Jour. Econ. Ent. 25: 135-413.

A mixture consisting of 1.5 lb. barium fluosilicate, 12 oz. nicotine sulphate, and 50 gal. water was sprayed on shade-grown tobacco at Quincy, Fla., to control the tobacco thrips (Frankliniella fusca Hinds). "It is evident from these observations that a combination spray of nicotine and barium fluosilicate is detrimental to tobacco foliage."

CHILDS, L.

(993)

1927. TWO SPECIES OF THRIPS INJURIOUS TO APPLES IN THE PACIFIC NORTHWEST. Jour. Econ. Ent. 20: 805-808, illus. [Abstract in Rev. Appl. Ent. (A) 16: 264-265. 1928.]

Injury to apples known as pansy spot is caused by the oviposition punctures of Frankliniella occidentalis Perg. and Acalothrips fasciatus L.

A 3-percent proprietary oil spray containing 1 pt. 40-percent nicotine sulphate to 100 gal. applied when the trees were in full bloom and again as soon as the petals fell reduced injury by more than 50 percent, though complete control was not secured. Oil alone was not effective.

LEWIS, H. C.

(1994)

1939. THE BEAN THRIPS ON PEARS. Calif. Dept. Agr. Monthly Bull. 18 (1): 52-58, illus. [Abstract in Expt. Sta. Rec. 61: 249. 1929.]

As a control measure against Heliothrips fasciatus Perg., a spray combination of oil and nicotine was used and found fairly effective, and when thoroughly applied resulted in a great saving to growers. Both young and adult thrips when actually hit by this spray were killed, but a drenching spray which washed all parts of the tree was necessary. The spray combination found most satisfactory consists of a light neutral white oil emulsion 1 gal., nicotine sulphate 0.5 pt., casein spreader 0.5 lb., hydrated lime 0.5 lb., and water 100 gal. This combination has killed those thrips it has hit and causes no injury to fruit or foliage.

WHITE, W. H.

(1995)

1916. THE SUGAR-BEET THRIPS. U. S. Dept. Agr. Bull. 421, 12 pp., illus. [Abstract in Rev. Appl. Ent. (A) 5: 37. 1917.]

In some tests a solution of 4 oz. nicotine sulphate with 4 lb. fish-oil soap in 50 gal. water killed 60 percent of the adults and 40 percent of the nymphs of Heliothrips femoralis Reut. With 5 oz. nicotine sulphate in the same mixture, 90 percent of the adults and 60 percent of the nymphs were killed, and with 6 oz. nicotine sulphate, all the adults and 95 percent of the nymphs were destroyed.

FERRANT, V.

(1996)

1907. DIE DER LANDWIRTSCHAFT SCHÄDLICHEN INSEKTEN, DEREN LEBENSWEISE UND BEKÄMPFUNG. Gesell. Luxemburger Naturf. Bull. Mens. Monats-Ber. Neue Folge 1: 233-244, illus. [In German.]

The control in Luxembourg of Heliothrips haemorrhoidalis Schödt is to wash the infested leaves with tobacco decoction, or fumigate them with insect powder or tobacco.

LIZER, C.

(1997)

1915. HELIOTHRIPS HAEMORRHODALIS INJURIOUS TO ORNAMENTAL PLANTS IN THE PROVINCE OF BUENOS AIRES, ARGENTINA. Monthly Bull. Agr. & Pl. Dis. 6, Nov. [Abstract in R. v. Appl. Ent. (A) 4: 53. 1916.]

Against this pest 1 percent tobacco extract in soft soap and water is successful, care being taken to wet the undersides of the leaves where the larvae and adult insects mainly congregate. In greenhouses where there are no very delicate plants recourse can be had to fumigation with some preparation of tobacco.

MOZNETTE, F. F.

(989)

1921. SOME INSECT PROBLEMS CONFRONTING THE AVOCADO GROWER. Jour. Econ. Ent. 14 (4): 341-344. [Abstract in Rev. Appl. Ent. (A) 10: 69-70. 1922.]

For the control of Tetranychus yothersi McG. (avocado red spider) and Heliothrips haemorrhoidalis Bch. spraying with liquid lime-sulphur (1:50) with the addition of nicotine sulphate (40-percent) at the rate of 1 to 900 to the diluted lime sulphur, or with nicotine sulphate at the same rate to 2 lb. powdered lime sulphur to 50 gal. water is advocated. Frankliniella cephalica Crawford may be controlled by the addition of 2 to 3 lb. soap to every 100 gals. of the above nicotine sulphate solution.

AHLBERG, O.

(999)

1922. GREENHOUSE THRIPS. Medd. Centralanst. Försöks, Jordbruks, No. 233 (Ent. avdel. 3.), 14 pp., illus. [In Swedish. Abstract in Rev. Appl. Ent. (A) 12: 108. 1924.]

Nicotine killed only a few thrips when used as a fumigant in a greenhouse. Nicotine sprays, however, gave excellent results at the rate of 1 part of a 10-percent solution nicotine sulphate in 60-100 parts water. As the eggs are not destroyed by such a spray, application must be made at short intervals. The greenhouse thrips known in Sweden are Parthenothrips dracaenae Heeg., Heliothrips haemorrhoidalis Bch., and H. femoralis Reut.

MILES, H. W.

(1000)

1928. AZALEA CULTURE IN BELGIUM. Jour. Minist. Agr. 35 (2): 137-147, illus. [Abstract in Rev. Appl. Ent. (A) 16: 499-500. 1928.]

For combating Heliothrips haemorrhoidalis Bch., dipping in winter, after pruning, in a mixture of soap, flowers of sulphur, chalk, and nicotine, with water as a diluent is recommended as a general preventive measure, and grafts, may be dipped in nicotine soap wash or in a suspension of pyrethrum before use.

BONDAR, G.

(1001)

1931. ANAPHOTHRIPS ORCHIDAEARUM BONDAR, A NEW PEST OF ORCHIDS, AND MEASURES AGAINST THIS AND OTHER INJURIOUS THYSANOPTERA. Chazaras e Quintaes 44 (4): 435-436, illus. [In Spanish. Abstract in Rev. Appl. Ent. (A) 20: 107-108. 1932.]

The above thrips is described as a new species from various orchids in Bahin. Other Thysanoptera attacking orchids in the State are Heliothrips haemorrhoidalis Bch., and another new species not yet described. Spraying with nicotine or lime-sulphur is the remedy advised, which is also suitable for Ceratophis lataniae Boisd., common on orchids and palms.

SCHEERLINCK.

(1002)

1933. PRINCIPAUX INSECTES ET MALADIES DE L'AZALEA INDICA. Publ. Off. Hort. Minist. Agr. Cl. Moyennes Sér. Phytopath. no. 3, 21 pp. illus. [Abstract in Rev. Appl. Ent. (A) 22: 271. 1934.]

The measures recommended in greenhouses against Heliothrips haemorrhoidalis Bch. include spraying with 1.5 or 2 parts nicotine and 20 parts soap in 1,000 parts rainwater or with an extract of 2-3 lb. tobacco leaves in 10 gal. water; dusting with tobacco; and fumigating with tobacco smoke.

Fumigation with tobacco against the adults of Gracilaria azaleella Erants should be carried out in the evenings.

CORBETT, G. H.

(1003)

1920. OBSERVATIONS ON COTTON THRIPS IN THE GEZIRA, BLUE NILE PROVINCE, SUDAN, IN 1918-1919. Bull. Ent. Res. 11(2): 95-100.

Nicotine sulphate was tried with soap in varying strengths, and the best solution found was 1 part of 32-percent nicotine sulphate to 1,200 parts of the soap solution, which was obtained by dissolving 1 lb. of the soap in 21 gal. of water (p. 100). This thrip was identified as Heliothrips indicus Bagn.

PERROTT, W. H.

(1004)

1925. A SPRAY FOR CITRUS TREES. Rhodesia Agr. Jour. 22 (4): 970-971. [Abstract in Rev. Appl. Ent. (A) 14: 96. 1926.]

A spray consisting of 1 gal. lime sulphur, 9 oz. nicotine sulphate (40-percent), 7 oz. universal spreader or 1 1/2 to 2 lb. sifted corn meal and 100 imperial gal. water is recommended for general use on citrus trees during the blossoming period and up to the time the fruit is the size of hazelnuts. It prevents the attacks of thrips, aphids, and Heliothrips (Chloridea) obsolata. Mr. R. W. Jack in discussing this formula states that the spray must be used with considerable care when the fruit is on the trees as it is apt to blemish it.

RORER, J. B.

(1005)

1917. CACAO SPRAYING EXPERIMENT, 1916-1917. Dept. Agr. Trinidad and Tobago Bull. 16 (3): 165-167. [Abstract in Rev. Appl. Ent. (A) 6: 152. 1918.]

A solution, composed of 5 lb. bluestone, 5 lb. lime, 41 1/2 gal. water, and 5 1/2 oz. 40-percent nicotine sulphate, was successfully applied against Heliothrips rubrocinctus.

BALLOU, H. A.

(1006)

1919.. REPORT ON CACAO THRIPS ETC. IN GRENADA. Report. to the Gov. of the Windward Islands, Grenada, February 7, pp. 2-14. [Abstract in Rev. Appl. Ent. (A) 7: 530-531. 1919.]

The practice of spraying cacao suffering from attacks of the cacao thrips (Heliothrips rubrocinctus) has been revised only since 1916. Bordeaux mixture with Black Leaf 40 is considered more lasting in its effect than soap and nicotine; both mixtures kill a high percentage of the thrips, but reinfestation occurs within a short time.

A wash containing 5 lb. Scalo and 1/2 lb. Black Leaf 40 to 100 gal. water is a satisfactory insecticide against the mealybug (Pseudococcus citri) and should also be effective against the black or acrobat ant (Cremastogestes sp.)

REYNE, A.

(1007)

1919. MEASURES AGAINST THE CACAO THRIPS. Meded. Dept. Landbouw Suriname, No. 15, 3 pp. Paramaribo. [In Dutch. Abstract in Rev. Appl. Ent. (A) 8: 439-440. 1920.]

A 2-percent solution of bordeaux mixture containing 40-percent nicotine sulphate (1 : 1000) gave no better control of cacao thrips (Heliothrips rubrocinctus Giard.) than did a bordeaux mixture alone.

ANONYMOUS.

(1008)

1921. AS DOENÇAS DAS PLÁTACÕES DE CACAO DAS ILHAS DE S. TOMÉ E PRINCÍPE. Companhia Agr. Ultramarina, Seccão Technica e de Patologia Vegetal, 142 pp., illus. Lisbon.

A mixture, consisting of 1 gal. tobacco extract, 1 lb. whale-oil soap, and 50 gal. water, was carefully sprayed on cacao trees infested with Heliothrips rubrocinctus in St. Thomas (Africa). If tobacco extract containing about 40 percent of nicotine is used, use 1 part to 1,500 or 2,000 parts of water plus 1 lb. soap to 50 lb. of mixture (p. 69).

REYNE, A.

(1009)

1921. THE CACAO THRIPS (HELIOTHRIPS RUBROCINCTUS GIARD). Dept. Landbouw Suriname Bull. 44, 214 pp., illus. [In Dutch with an English summary.]

Against this thrips on cacao trees in Dutch Guiana Black Leaf 40 was used in all the nicotine experiments. A 0.1-percent solution with 1 percent soap killed more than 90 percent of the adults, but no more than 50 percent of the larvae. Nicotine also has some effect on the eggs. Thrips are also killed by the vapors of nicotine (p. 209).

Bordeaux combined with nicotine has been used in Trinidad since 1917 and has given good results (p. 209).

MOZNETTE, G. F.

(1010)

1922. INSECTS INJURIOUS TO THE MANGO IN FLORIDA AND HOW TO COMBAT THEM. U. S. Dept. Agr. Farmers' Bull. 1257, 22 pp., illus. [Abstract in Rev. Appl. Ent. (A) 10: 538-539. 1923.]

For combating the red-banded thrips (Heliothrips rubrocinctus Giard.) the lower surfaces of the leaves should be sprayed before they turn brown with nicotine sulphate (40-percent) at 1 to 900, adding fish-oil soap to the diluted mixture to make it spread evenly. When Tetranychus yotheresi McG. is present at the same time the nicotine sulphate may be added to the lime-sulphur spray, the nicotine being used at the strengths given above, but the soap being omitted.

WILLIAMS, R. O.

(1011)

1922. CACAO CULTIVATION IN GRENADA. Dept. Agr. Trinidad and Tobago. Bull. 19 (4): 215-223. Port of Spain. [Abstract in Rev. Appl. Ent (A) 10: 324. 1922.]

Against Heliothrips rubrocinctus Giard the remedies are improved cultivation and nicotine sulphate sprays.

BONDAR, G.

(1012)

1934. INSECTS INJURIOUS TO CACAO. Correio-Agr. 2 (1): 5-14. [Abstract in Rev. Appl. Ent. (A) 12: 182. 1924.]

The addition of 1/2 lb. nicotine sulphate to 42 gal. Bordeaux mixture has given good results in Central America against Heliothrips rubrocinctus Giard.

COOLEY, R. A.

(1013)

1914. TWO NEW INSECT PESTS OF CURRANTS AND GOOSEBERRIES. Jour. Econ. Ent. 7: 125-126. [Abstract in Rev. Appl. Ent. (A) 2: 380. 1914.]

Currant thrips (Liothrips montanus) on gooseberries and red and black currants were practically all destroyed by Black Leaf 40 (1:1,000) and soap. Lime-sulphur solution was less effective.

GUERCIO, G. del

(1014)

1931. LIOTHIRPS OLEAE AND ITS RELATIONS WITH THE SCOLYTID OLIVE BORERS. Redia 15: 75-195, illus. [In Italian. Abstract in Rev. Appl. Ent. (A) 19: 622. 1931.]

Remedial measures suggested against this thrips include a spray containing 1 to 1.5 percent of tobacco extract and 1 to 1.5 percent of soap.

CABANYES SALAZAR, J.

(1015)

1923. EL ARANUELO O CARRA DEL OLIVO (PHLOEOTHRIPS OLEAE). Hoja Agr. Popular 5 (47): 302-303. [Abstract in Rev. Appl. Ent. (A) 11: 351. 1923.]

Of 17 insecticides tested against Phloeothrips oleae a proprietary compound containing nicotine gave the best results. It should be sprayed on the olive trees in the morning or evening at the period when the insects are of a black color.

CONTINI, E.

(1016)

1923. THE CHIEF DISEASES AND PESTS OF THE OLIVE AND METHODS FOR COMBATING THEM. Riv. Agr. 28 (18): 277-279. [In Italian. Abstract in Rev. Appl. Ent. (A) 11: 328. 1923.]

A nicotine spray should be used against Phloeothrips oleae.

VUILLET, A.

(1017)

1914. ON THE PRESENCE IN FRANCE OF THE PEA THRIPS (PHYSOTHRIPS PYRI DANIEL). Bull. Soc. Pathol. Veg. de France 1: 18-20. [In French.]

In the United States sprays consisting of nicotine soap solutions, with or without kerosene, are used to combat this pest.

RITCHIE, A. H.

(1018)

1932. REPORT OF THE ENTOMOLOGIST, 1931. Tanganyika Terr. Dept. Agr. Ann. Rept. 1931, pp. 83-86. [Abstract in Rev. Appl. Ent. (A) 21: 106-107. 1933.]

Coffee was seriously affected by Physothrips xanthocerus Hood and Retithrips acyeticus Marchal. Sprays recommended as a result of field trials are lime-sulphur (1:80) with the addition of 1 lb. calcium caseinate and 1/2 pt. 40-percent nicotine sulphate to each 100 gals.; or, as a combined spray against Hemiteles and thrips in February-March, bordeaux mixture (1: 1: 10) with 1 oz. nicotine sulphate and 1 lb. fish-oil soap.

HALL, W. J., and FORD, W. K.

(1019)

1933. NOTES ON SOME CITRUS INSECTS OF SOUTHERN RHODESIA. Publ. Brit. S. Afr. Co., no. 2, pp. 1-51, illus. [Abstract in Rev. Appl. Ent. (A) 22: 79-80. 1934.]

Against Scirtothrips aurantii Foure, citrus trees are sprayed annually with 1 gal. lime-sulphur and 8 oz. spreader in 100 gal. water, with the addition in groves where Doralis (Aphis) taveresi del Guer. is present, of 3 oz. nicotine (95-98 percent).

VOSLER, E. J.

(1020)

1915. CALENDAR OF INSECT PESTS. Calif. State Comn. Hort. Monthly Bull. 4 (5-6): 280-284, illus. [Abstract in Rev. Appl. Ent. (A) 3: 557. 1915.]

Four applications of lime-sulphur or nicotine spray may be necessary to control the orange thrips (Scirtothrips citri).

FLEBUT, A. J.

(1021)

1922. THE USE OF NICOTINE DUSTS IN THE CONTROL OF CITRUS THRIPS. Calif. Dept. Agr. Monthly Bull. 11 (10): 745-754. [Abstract in Rev. Appl. Ent. (A) 11: 51-52. 1923.]

Spraying is a more efficient remedy than dusting for controlling the citrus thrips (Scirtothrips citri Moulst.).

A dust composed largely of tobacco strengthened with nicotine sulphate seemed to be more efficient than the others.

RUSSO, G.

(1022)

1930. THE DECLINE OF CACAO PLANTATIONS IN THE REPUBLIC OF SANTO DOMINGO. Agr. Colon., 24 (10): 505-524, illus. [In Italian. Abstract in Rev. Appl. Ent. (A) 19: 117. 1931.]

The addition of nicotine to the bordeaux mixture used as a fungicide is effective against Selenothrips rubrocinctus Giard on cacao

BONDAR, G.

(1023)

1924. A PEST OF ROSES IN BAHIA. Correio-Agr. 2 (2): 46-47. [Abstract in Rev. Appl. Ent. (A) 12: 225. 1924.]

A nicotine spray prepared by boiling 4 lbs. of leaf tobacco refuse in 1 gal. water is diluted with four parts water to one part infusion plus a little soap for combating Stylothrips bondari Morg.

DUSTAN, A. G., and MATTHEWMAN, W. G.

(1024)

1932. NOTES ON TAENIOTHRIPS GLADIOLI MOULTON AND STEINWEDEN. Ent. Soc. Ont. 62nd Ann. Rept. 1931, pp. 84-87. [Abstract in Rev. Appl. Ent. (A) 21: 257-262. 1932.]

Immersing the corms in autumn in dips containing nicotine sulphate was not effective against the gladiolus thrips.

SMITH, F. F., and WEIGEL, C. A.

(1025)

1932. TAENIOTHRIPS GLADIOLI M. and S., A NEW PEST OF GLADIOLUS. Jour. Econ. Ent. 25 (2): 312-318, illus. [Abstract in Rev. Appl. Ent. (A) 20: 420-421. 1932.]

One of the suggested control measures is to immerse the infested corms for 15 to 20 minutes in a solution containing 1 oz. free nicotine to 3 gal. water or for 1 hour in a nicotine and soap solution. None of these treatments are likely to affect the eggs, and they would have to be repeated when the eggs have hatched.

McDANIEL, E. I.

(1026)

1933. SPRAYING TO CONTROL THE GLADIOLUS THRIPS, TAENIOTHIRPS GLADIOLI M. & S., IN MICHIGAN IN THE SEASON OF 1932. Jour. Econ. Ent. 26: 835-836. [Abstract in Rev. Appl. Ent. (A) 21: 466, 604. 1933.]

Nicotine sprays which were used by growers, often proved ineffective owing to excessive dilution, or failure to apply immediately after mixing.

WEIGEL, C. A., and SMITH, F. F.

(1027)

1933. THE PRESENT STATUS OF THE GLADIOLUS THRIPS IN THE UNITED STATES. Jour. Econ. Ent. 26 (3): 523-528. [Abstract in Rev. Appl. Ent. (A) 21: 464. 1933.]

Observations in several greenhouses show that Taeniothrips gladioli Moul. & Staw. is not controlled by spraying twice weekly with strong solution of nicotine.

GAMERELL, F. L.

(1028)

1934. GLADIOLUS THRIPS CONTROL STUDIES AND OBSERVATIONS ON BULB MITE INFESTATION. Jour. Econ. Ent. 27: 1159-1166, illus.

The plants sprayed with paris green-brown sugar or with nicotine-casein mixtures were larger than those sprayed with other materials, and the injury by thrips (Taeniothrips gladioli) and mites (Rhizoglyphus hyacinthi) was less.

CAMERON, A. F., and TREHERNE, R. C.

(1029)

1917. WORK OF COMBATING THE PEAR THRIPS IN THE SAANICH PENINSULA. Agr. Jour. Victoria, Brit. Columbia 1 (12): 208. [Abstract in Rev. Appl. Ent. (A) 5: 202-203. 1917.]

A spray of whale-oil soap 5 lb., Black Leaf 40, 3/4 pt. and water 85 gal. gave absolute control of pear thrips (Taeniothrips inconsequens) on apples, but the results on pears and prunes were not satisfactory. Owing to the prevalence of apple scab in 1917 a combination spray of summer strength lime-sulphur and Black Leaf 40(1:900) was recommended for the second and third applications on apples and pears. As a first application for apples, pears, and cherries the whale-oil soap and Black Leaf 40 combination spray is advised. The first application should be made when the thrips make their appearance, the second as the blossoms are showing color, and the third just after they are shed.

SCHÖYEN, T. H.

(1030)

1917. REPORT ON PLANT DISEASES IN NORWAY IN 1916. Saertryk ur Landbruks direktørens Aarsberetning for 1916, pp. 37-85. Christiania. [In Norwegian. Abstract in Rev. Appl. Ent. (A) 6: 284-286. 1918.]

A nicotine spray is suggested as a control for Taeniothrips inconsequens.

WINSLOW, R. M.

(1031)

1917. FRUIT GROWERS REALISE THAT INCREASED SPRAYING IS NECESSARY. Agr. Jour. Victoria, Brit. Columbia, 1 (12): 218. [Abstract in Rev. Appl. Ent. (A) 5: 203. 1917.]

The result of experimental work shows that nicotine sulphate and a whale-oil soap spray will control pear thrips (Taeniothrips inconsequens). Against aphids a mixture of Black Leaf 40, 6 oz., lime 2 lb., and 100 gal. water destroys practically all the insects.

CAMERON, A. E., and TREHERNE, R. C.

(1032)

1918. THE PEAR THRIPS (TAENIOTHRIPS INCONSEQUENS UZEL) AND ITS CONTROL IN BRITISH COLUMBIA. Canad. Dept. Agr. Ent. Br. Bull. 15, pp. 1-51, illus.

Four applications were more effective in controlling the thrips than two; nevertheless, the results obtained from two sprayings were quite satisfactory. The general results attending the use of the whale-oil-soap-nicotine mixture closely approximate in degree to those of the oil-nicotine mixtures, Black Leaf 40 was the nicotine used (pp. 44-46).

TREHERNE, R. C.

(1033)

1919. INSECT NOTES OF THE YEAR 1919. Agr. Jour. Dept. Agr., Victoria, Brit. Columbia 3 (11-12): 258, 281, 301. [Abstract in Rev. Appl. Ent. (A) 7: 170-172. 1919.]

It has been found that spraying against the adults of the pear thrips (Taeniothrips inconsequens) is more important than against the larvae, and applications of nicotine and soap spray were made on several dates. Soap and nicotine sprays should be applied as soon as the onion thrips (Thrips tabaci) appear in numbers in the axils of the leaves.

ESSIG, E. O.

(1034)

1920. THE PEAR THRIPS. Calif. Agr. Expt. Sta. Circ. 223, 9 pp., illus. [Abstract in Rev. Appl. Ent. (A) 9: 380. 1921.]

A spray of 5 gals. miscible oil and 1 pt. Black Leaf 40 made up to 200 gal. with water should be applied against the adults Taeniothrips

inconsequens Uzel) repeatedly until their numbers decrease. If the larvae become numerous, spraying should be carried out with the above formula modified to 3 gal. of miscible oil and 1 1/2 pt. Black Leaf 40. A 5-percent "Nico dust" kills all exposed thrips; it is more effective against the adults than the immature stages.

PHIPPS, C. R.

(1035)

1921. CONTROL OF THE PEAR THRIPS. N. Y. Agr. Expt. Sta. Bull. 484, 11 pp., illus. [Abstract in Rev. Appl. Ent. (A) 9: 325-326. 1921.]

As soon as the adults of Taeniothrips inconsequens Uzel (pyri Dan.) appear in numbers the ends of the buds should be thoroughly wetted with miscible oil and nicotine sulphate. A spray of lime-sulphur and Bordeaux mixture with the addition of 3/4 pt. nicotine sulphate to every 100 gal. of spray should be applied when the cluster buds are separating. For the destruction of the larvae on the fruit nicotine sulphate may be added to the usual bordeaux or lime-sulphur spray or nicotine sulphate and soap may be used.

SMITH, L. M.

(1036)

1933. THE EMERGENCE OF PEAR THRIPS IN THE HEALDSBURG AREA OF CALIFORNIA IN 1932. Calif. Agr. Expt. Sta. Bull. 562, 16 pp., illus. [Abstract in Rev. Appl. Ent. (A) 22: 133-134. 1934.]

Emergence in orchards sprayed or dusted with nicotine [cf. R.A.E. 16: 118] during the preceding spring showed that three to six applications had failed to reduce the population of Taeniothrips inconsequens Uzel to a negligible number.

BÄUMLER, C.

(1037)

1877. DIE MILBEN-, ROTHE ODER BLUT - SPINNE (ACARUS TELARIUS) UND DER BLASENFUSS (THRIPS) Deut. Mag. Garten- und Blumenkunde, pp. 134-135.

The tobacco fumigation of potted flower plants bearing thrips is recommended by Dr. Leunis in his work on Zoology.

SCHRÖDER, E.

(1038)

1932. A THRIPS IN AN EARLY VARIETY OF CABBAGE. Obst- u. Gemusebau 70: 27-28, illus. [In German. Abstract in Rev. Appl. Ent. (A) 21: 528. 1933.]

The application of a spray containing 2 percent tobacco and 0.75 percent soft soap gave good results against Thrips angusticeps Uzel.

FUIMEK, L.

(1039)

1911. THRIPS FLAVA SCHR. ALS NELKENSCHÄDLING UND EINIGE BEMERKUNGEN ÜBER NIKOTINRÄUCHERVERSUCHE IN GLASHÄUSERN. Ztschr. Pflanzkrank. 21 (5): 276-280. illus.

Thrips on plants in a greenhouse were fumigated over night by using 1,000 g. of tobacco dust for each 100 cu. m. of space. The results obtained were not satisfactory. A large percentage of them were not killed, because they were not reached by the smoke.

PAPE, H.

(1040)

1925. TOMATO PESTS. Gartenwelt, no. 36-37. 1925. [Abstract in Anz. Schädlingk. 1 (12): 142-143. In German. Abstract in Rev. Appl. Ent. (A) 14: 99. 1926.]

Spraying with nicotine sulphate or tobacco soap on dull days or fumigation with nicotine or pyrethrum are the measures recommended against Thrips flavus Schr. var. obsoletus Uzel. Spraying with nicotine should check the potato flea beetle Psylliodes affinis Payk. Spraying with lime-sulphur with the addition of 1 percent nicotine or 5 percent tobacco dust should be adopted for the control of Lygus pabulines L. and L. pratensis L.

(1041)

1927. A FEW IMPORTANT INSECT PESTS ON CARNATIONS AND THEIR CONTROL. Gartenwelt. 31: 288-289, illus. [In German.]

The control of Thrips flavus Schr., T. tabaci Lind., and T. haemorrhoidalis Bché. in hothouses is effected by repeated fumigation with tobacco or insect powder, or with tobacco extract.

ADAMS, R.

(1042)

1902. DER THRIPS UND DESSEN BEKÄMPFUNG. Gartenwelt 6 (27): 315-316.

In Germany it is recommended that Thrips haemorrhoidalis on shrubs and flowers should be sprayed with tobacco juice and soap solution, or if the plants are in greenhouses they should be fumigated with tobacco.

ZÖLLIG, F.

(1043)

1927. CONTROLLING THRIPS ON CARNATIONS. Gartenwelt 31: 110. (In German.)

Fumigating Thrips haemorrhoidalis on carnations in Germany with a mixture of tobacco leaves and insect powder has been found very effective. The hothouses and hotbeds must be closed airtight, and the plants should be absolutely dry.

MAYET, V.

(1044)

1898. LES INSECTES DE L'OLIVIER. Prog. Agr. et Vitic. 29: 678-681.

Olive trees infested with Thrips oleae Costa should be fumigated with tobacco. In order to produce a dense smoke under the trees, use any part of the tobacco plant suitable to burn.

FRENCH, C., JR.

(1045)

1913. INSECT PESTS OF THE POTATO. Jour. Dept. Agr. of Victoria, Melbourne 11(12): 727-748, illus. [Abstract in Rev. Appl. Ent. (A) 2: 117-119. 1914.]

Against Thrips tabaci Lind. on potatoes the following spray mixture is recommended in Australia: Steep 1 lb. tobacco in 1 gal. hot water, and soak for 24 hours; boil 1 lb. soap in 1 gal. water, strain the tobacco water into the soap water, stir and make up to 5 or 6 gal. (p. 118).

GURNEY, W. B.

(1046)

1914. THRIPS IN ORCHARDS. A WARNING TO FRUIT-GROWERS. Agr. Gaz. N. S. Wales 25 (8): 685-687. [Abstract in Rev. Appl. Ent. (A) 2: 705. 1914.]

For combating Thrips tabaci the trees should be sprayed as late as possible before the buds open with lime-sulphur solution, and as the buds are opening use tobacco wash, 1 lb. to 2 gal. water, with high pressure.

SAYRE, C. B.

(1047)

1916. COMMERCIAL ONION GROWING. Ind. Agr. Expt. Sta., Circ. 57, 25 pp., illus. [Abstract in Rev. Appl. Ent. (A) 5: 186. 1917.]

The mixture recommended against the onion thrips, Thrips tabaci, consisted of 5 oz. concentrated nicotine sulphate, 4 lb. whale-oil soap, and 50 gal. water.

KINSEY, M. E.

(1048)

1917. ONION THRIPS, (THRIPS TABACI). Ind. State Ent. Ninth Ann. Rept. (1915-1916), pp. 43-47, illus. [Abstract in Rev. Appl. Ent. (A) 6: 506. 1918.]

A contact spray should be applied at intervals of not more than 3 weeks until the pest is controlled. The formula recommended is 4.3 oz. nicotine sulphate and 4 lb. whale-oil soap to 50 gal. water.

BOVELL, J. R.

(1049)

1921. INSECT PESTS AND FUNGOID DISEASES, ETC. Barbados Dept. Agr. Rept. 1918-1919, pp. 22-27. [Abstract in Rev. Appl. Ent. (A) 9: 550. 1921.]

Thrips tabaci attacking eschalots were successfully controlled by soap and Black Leaf 40.

BOURNE, B. A.

(1050)

1921. REPORT OF THE ASSISTANT DIRECTOR OF AGRICULTURE ON THE ENTOMOLOGICAL AND MYCOLOGICAL WORK CARRIED OUT DURING THE SEASON UNDER REVIEW. Barbados Dept. Agr. Rept. 1919-1920, pp. 10-31. [Abstract in Rev. Appl. Ent. (A) 9: 322-323. 1921.]

Thrips tabaci Lind. attacking shallot (Allium ascalonicum) was controlled by nicotine sulphate.

HORSFALL, J. L.

(1051)

1921. SOURCES OF INFESTATION OF THRIPS TABACI IN IOWA. Jour. Econ. Ent. 14: 493-496, illus. [Abstract in Rev. Appl. Ent. (A) 10: 191-192.]

Onion thrips were checked by the application of nicotine sulphate and soap by means of a Hardie barrel sprayer with hose extension.

PETTIT, R. H.

(1052)

1924. ONION THRIPS (THRIPS TABACI). IMPROVED METHODS OF CONTROL. Mich. Agr. Expt. Sta. Quart. Bull. 6 (3): 107-109, illus. [Abstract in Rev. Appl. Ent. (A) 12: 500. 1924.]

Nicotine (40-percent) at 1 to 800 plus 4 lb. laundry soap to 100 gal. is recommended for the control of Thrips tabaci. Two applications should be made with an interval of 6 or 7 days. If a dust is applied, one of the standard nicotine dusts should be used.

BOURNE, A. I.

(1053)

1926. A STUDY OF THE LIFE HISTORY AND CONTROL OF THE ONION THRIPS. Mass. Agr. Expt. Sta. Bull. 227, pp. 48-51. [Abstract in Rev. Appl. Ent. (A) 14: 483-490. 1926.]

The most satisfactory insecticide against onion thrips (Thrips tabaci Lind.) consists of 1/2 pt. nicotine sulphate (40-percent) to 100 gal. water (1:1,500) with the addition of 6-8 lb. potash oil soap per 100 gal. The spray must be applied in a fine mist at a pressure of 125-150 lb. A second application made 7 to 8 days after the first is recommended.

RUSSO, G.

(1054)

1927. RELATION OF DISEASES OF THE CULTIVATED COTTON, POTATOES, EGG PLANT, AND ONIONS IN THE PROVINCE OF MONTE CHRISTIE, DOMINICAN REPUBLIC. Lab. Ent. Estac. Nacion. Agron. y Col. Agr. Circ. 1, pp. 1-13. [In Spanish. Abstract in Biol. Abs. 7 (1): 147. Entry 1447. 1933.]

Thrips tabaci Lind. is widely distributed and very injurious to onions. A spray of tobacco extract or kerosene emulsion is recommended.

BOURNE, A. I.

(1055)

1929. SPRAYING FOR THE CONTROL OF ONION THRIPS IN MASSACHUSETTS. Jour. Econ. Ent. 22(4): 679-683, illus. [Abstract in Biol. Abs. 5 (6-7): 1760. Entry 17,921. 1931.]

A combined spray of nicotine and a soft, pourable, potash fish-oil soap has given satisfactory control of the onion thrips (Thrips tabaci). Repeated sprays at 7 to 8 day intervals are necessary to reach newly-hatched young and migrants from near-by fields. A promising power sprayer adopted for field spraying of onions has been developed.

FLINT, W. P. et al.

(1056)

1929. ENTOMOLOGY INVESTIGATIONS. Ill. Agr. Expt. Sta. Ann. Rept. 1928-1929, pp. 138-151, illus. [Abstract in Rev. Appl. Ent. (A) 18: 249-250. 1930.]

Best results against the onion thrips (Thrips tabaci Lind.) were obtained with a 2.4 percent nicotine dust applied with a hand duster and driven straight down into the plant.

VINSON, J.

(1057)

1929. THE ONION THRIPS (THRIPS TABACI LINDEMAN). Maurice Dept. Agr. Leaflet no. 29, 3 pp., Reduit. [In French. Abstract in Rev. Appl. Ent. (A) 18: 238. 1930.]

Sprays recommended include 4 oz. nicotine sulphate, 4 lb. whale-oil soap and 40 gal. water, which has hitherto given the most satisfactory results, and a simple decoction of tobacco leaves at the rate of about 1 lb. to 2 gal. water.

FEDOROV, S. M.

(1058)

1930. TOBACCO THRIPS (THRIPS TABACI LIND.) AS A PEST OF TOBACCO PLANT IN CRIMEA. Eos 6 (3): 229-248, illus. [Abstract in Rev. Appl. Ent. (A) 18: 700. 1930.]

Effective control of Thrips tabaci Lind, can be obtained by spraying with 2 percent soap solution or 0.05 percent tobacco extract.

PEARSON, H. M.

(1059)

1930. THE THRIPS FACTOR IN ONION STERILITY. Jour. Econ. Ent. 23: 829-831. [Abstract in Rev. Appl. Ent. (A) 19: 94. 1931.]

A spray consisting of nicotine sulphate and fish-oil soap is effective against Thrips tabaci, although scarcely practicable.

ILLINGWORTH, J. F.

(1060)

1931. YELLOW SPOT OF PINEAPPLES IN HAWAII. Phytopathology 21 (9): 865-880, illus. [Abstract in Rev. Appl. Ent. (A) 19: 648. 1931.]

In order to keep Thrips tabaci out of pineapple plants, various substances have been tried, including tobacco dust. A deterrent added to these, composed of oil emulsion with tobacco extract, increases their efficiency. Dusting sulphur is also a promising remedy; tobacco extract alone evidently volatilizes too quickly, as it has proved ineffective.

BOURNE, A. I., and WHITCOMB, W. D.

(1061)

1932. DEPARTMENT OF ENTOMOLOGY. Mass. Agr. Expt. Sta. Bull. 280, pp. 213-220. [Abstract in Rev. Appl. Ent. (A) 20: 405-406. 1932.]

A nicotine-soap spray reduced the numbers of the onion thrips (Thrips tabaci Lind.) on seed onions from 1,200 to 125 per 100 plants in one instance, and from 3,250 to 190 in another. Both soot and tobacco dust, applied to the crowns of carrots and the soil around them, gave almost complete control of the carrot rust fly (Psila rosae F.), and slightly stimulated the growth of the plants.

BRANNON, L. W.

(1062)

1932. OBSERVATIONS OF THE ASSOCIATION OF THRIPS WITH ARSENICAL INJURY ON SNAP BEANS. Jour. Econ. Ent. 25 (5): 1112-1113. [Abstract in Rev. Appl. Ent. (A) 20: 700. 1932.]

Insecticide injury observed on the plot of beans treated with magnesium arsenate in May and June did not increase following applications made in combination with nicotine sulphate (1 to 400), which controlled Thrips tabaci Lind.

CARTER, W.

(1063)

1932. COMPARISON OF TOBACCO DUST WITH OTHER FORMS OF NICOTINE IN CONTROL OF YELLOW SPOT DISEASE OF PINEAPPLES. Jour. Econ. Ent. 25 (5): 1021-1035. [Abstract in Rev. Appl. Ent. (A) 20: 690. 1932.]

Tobacco dust was tested together with seven other forms of nicotine as a control measure against yellow spot, a virus disease transmitted by Thrips tabaci Lind. The results clearly indicate the superiority of tobacco dust over the other nicotine applications.

BOURNE, A. I., and WHITCOMB, W. D.

(1064)

1933. DEPARTMENT OF ENTOMOLOGY. Mass. Agr. Expt. Sta. Bull. 293 (Ann. Rept. 1932), pp. 28-34. [Abstract in Rev. Appl. Ent. (A) 21: 417-419. 1933.]

Sprays of nicotine sulphate gave a greater and more rapid reduction in the number of onion thrips (Thrips tabaci Lind.) than derrisol (p. 417). Tobacco dust and soot broadcast three times at weekly intervals proved very satisfactory against the carrot rust fly (Psila rosae F.) (p. 418), though when applied twice these materials gave little advantage over the untreated plots.

BARTSCH, G.

(1065)

1901. ALLGEMEINES ÜBER DIE ORCHIDEEN. Gartenflora 50: 286-291.

A number of tin vessels filled with tobacco extract, placed on the steam pipes in hot houses, will produce enough fumes to keep thrips on orchids in check.

FROGGATT, W. W.

(1066)

1906. THRIPS OR BLACK FLY (THYSANOPTERA). Agr. Gaz. N. S. Wales 17 (10): 1005-1011.

Fumigation with tobacco in greenhouses is the only successful treatment for thrips in England and America, but it requires a stronger dose to keep them than it does to destroy aphids. Where the plants are in pots and small, they can be taken and dipped upside down in kerosene emulsion, or soap, and tobacco waste.

DRAPS, E.

(1067)

1907. LES INSECTICIDES ET LEUR EMPLOI EN SERRE. Tribune Hort. 2: 88.

Make a decoction, using the ribs of tobacco leaves and other waste tobacco, and dip the greenhouse plants bearing thrips or aphids in the decoction or spray them three times. This is recommended in Belgium.

RUSSELL, H. M.

(1068)

1912. THE RED-BANDED THRIPS. U. S. Dept. Agr., Bur. Ent. Bull. 99, pt. 2, 29 pp. [Abstract in Rev. Appl. Ent. (A) 1: 98-99. 1913.]

A spray made of one part Black Leaf tobacco extract containing 40-percent nicotine to 1,500 or 2,000 parts of water, with 1 lb. whale-oil soap to every 50 gal., gave good results against the red-banded thrips.

LABOY, O.

(1069)

1913. RUBBER IN BRAZIL. Minist. Agr. Ind. e Comm. 153 pp. illus. Rio de Janeiro. [In Portuguese. Abstract in Rev. Appl. Ent. (A) 2: 193-194. 1914.]

A spray of 1 percent solution of nicotine or petroleum emulsion is useful against thrips on rubber.

POUILLAUDE, I.

(1070)

1913. SOME INJURIOUS THYSANOPTERA. Insecta, Rennes, April, pp. 139-145, illus. [In French. Abstract in Rev. Appl. Ent. (A) 1: 217. 1913.]

In the open a 1.5 percent solution of nicotine with 1.25 percent soft soap is recommended. Tobacco fumigation is recommended in green-houses.

FRENCH, C. JR.

(1071)

1914. THE THRIPS PEST. Victoria Dept. Agr. Jour. 12 (11): 688.
[Abstract in Rev. Appl. Ent. (A) 3: 97. 1915.]

Benzol emulsion is recommended against thrips and also the following preparation: Steep 1 lb. tobacco in 1 gal. hot water, leave to soak for 24 hours; boil 1 lb. soap in 1 gal. water until the soap is dissolved; strain the tobacco water into the soap water, stir well and make up to 5 or 6 gal.

GURNEY, W. B.

(1072)

1914. SPRAYING FOR THRIPS. Agr. Gaz. N. S. Wales 25 (9): 821. [Abstract in Rev. Appl. Ent. (A) 3: 25. 1915.]

Apple and pear blossoms should be sprayed against thrips with a tobacco wash prepared as follows: Steep 1 lb. of tobacco refuse overnight in a gallon of water; strain off the liquid in the morning and add 1/4 lb. soft soap with 1 gal. hot water; apply while still warm though not hot. The addition of the soft soap will be an advantage in the first spraying as it makes the tobacco adhere better, but should be used more sparingly in later applications to the open blooms.

TCHIKOV, P. V.

(1073)

1915. A SHORT GUIDE TO THE CULTIVATION OF TOBACCO IN THE DISTRICT OF SUCHUM. Bull. of the Suchum Hort. and Agr. Expt. Sta. no. 20, 16 pp. Suchum. [In Russian. Abstract in Rev. Appl. Ent. (A) 4: 297. 1916.]

The tobacco thrips should be controlled with sprays of tobacco extract.

URICH, F. W.

(1074)

1916. INSECT PESTS IN TRINIDAD. Ent. Rept., Min. Meet. Bd. Agr. Trinidad, pp. 1-56. [Abstract in Rev. Appl. Ent. (A) 5: 171. 1917.]

The spraying mixture that has proved most efficacious against thrips on cacao is Black Leaf 40 (1 : 1,200). Stronger solutions are required for killing the larvae and nymphs than for the adults, the nymphs being the most resistant.

VAN HERMANN, H. A., and CUNLIFFE, R. S.

(1075)

1916. VEGETABLE GROWING. Estacion Expt. Agr. Havana. Circ. 51, 75 pp., illus. [In Spanish. Abstract in Rev. Appl. Ent. (A) 5: 80. 1917.]

Thrips and other insects that suck the juice of plants can be controlled by tobacco solutions, or strong soap.

URICH, F. W.

(1076)

1918. THIRPS, BLACK ANTS AND OTHER INSECT PESTS OF CACAO IN GRENADA, WITH A NOTE ON COCONUT DISEASE. Rept. presented to the Govt. of Grenada, 25 pp. illus. Trinidad. [Abstract in Rev. Appl. Ent. (A) 6: 496-497. 1919.]

Artificial control of thrips, which is a necessity for cacao growers, should consist of spraying three times, at one month's interval, with bordeaux mixture (5: 5: 50), to which is added nicotine sulphate (1 : 1,000).

BRUCK, E.

(1077)

1922. CITRICULTURE IN CALIFORNIA. Bol. Minist. Agr., Indus. e Comm. Brazil, 11 (3): 55-153, illus. [In Portuguese.]

Against aphids and thrips on citrus trees in California the following spray mixture is used: 1 pt. tobacco extract (40-percent nicotine sulphate), 4 to 5 lb. fish-oil soap, and 100 gal. water (p. 128). This formula is cited by the author in his monograph on the citrus culture in California, quoted from the American literature.

PAOLI, G.

(1078)

1922. POWDERED TOBACCO AS A SUBSTITUTE FOR THE EXTRACT. Costa Azzurra Agr. Floreale 2 (1): 5-6. In Italian.

Tobacco powder was soaked in water for 10 to 12 hours, using 1 part of the powder to 4 or 5 parts of water; this gave a dark brown solution with a strong tobacco odor. A 3.5 to 4 percent solution of this decoction was very effective against thrips on fruit trees.

TAYLOR, W. H.

(1079)

1923. VINE-CULTURE UNDER GLASS. Jour. Dept. Agr. N. Zeal. 26: 172-177.

A tobacco spray applied two or three nights in succession will control thrips on grape vines under glass. Tobacco should not be used when the berries are ripening, as the flavor of the tobacco remains for some time (p. 177).

COLLAED, J. W.

(1080)

1924. CITRUS-CULTURE. Jour. Dept. Agr. N. Zeal. 29: 420.

An application of nicotine sulphate (1 : 750) is recommended against thrips on citrus trees in New Zealand, when red-oil emulsion has not been fully effective. Such a spray will also control any black aphid present.

DUBOIS, P.

(1081)

1924. CONTRE LES INSECTES INVISIBLES AUX OEILLETS. Vie Agr. et Rur. 24 (15): 238. April 12. [Abstract in Rev. Appl. Ent. (A) 12: 253. 1924.]

Nicotine proved by far the most successful of all the remedies tried against thrips on carnations. The formula recommended is 1 gal. 10-percent nicotine with 10 lb. soft soap to 100 gal. water. The nicotine sprays should be applied as late as possible in the evening.

RAYMOND, G.

(1082)

1924. CONTRIBUTION TO THE STUDY OF THRIPS ATTACKING CARNATIONS. Ann. Soc. Linn. Lyon, N. S. 70 (1923): 160-171, illus. [In French. Abstract in Rev. Appl. Ent. (A) 13: 164-165. 1925.]

The best remedy was nicotine and soap solution.

PAPE, H.

(1083)

1927. INJURIES ON CYCLAMEN BY THRIPS. Gartenwelt 31: 8-9, illus. [In German.]

Immediate control of thrips on cyclamen in Germany is effected by repeated fumigation with tobacco or with insect powder. Spraying with a 10-percent nicotine sulphate solution in 60 to 100 parts of water at frequent intervals has been found very effective.

SCHUBACK, G.

(1084)

1927. CONTROLLING THRIPS IN CARNATIONS. Gartenwelt 31: 127. [In German.]

On cloudy days or in the evenings the infested plants were sprayed once a week with a mixture consisting of 250-300 g. nicotine sulphate, 1 kg soft soap, and 200 l. water.

SMEE, C.

(1085)

1927. REPORT OF THE ENTOMOLOGIST. Nyasaland Dept. Agr. Rept. 1926, pp. 13-20. [Abstract in Rev. Appl. Ent. (A) 16: 74-77. 1928.]

Ordinary sprays, such as tobacco extract and paraffin emulsion, were successful when used early against thrips.

I. ACARINA, 1902-1934

1. Red Spiders, 1904-1934

SHERARD, O.

(1086)

1926. THE WINTER SPRAYING OF FRUIT TREES. TESTS WITH THE NEW TAR-OIL WASHES. Ireland. Dept. Lands & Agr. Jour. 25 (3): 297-304. [Abstract in Rev. Appl. Ent. (A) 14: 183-184. 1926.]

Caustic soda and nicotine, among other preparations, were quite ineffective against the eggs of the red spider (Eryobia).

GARMAN, P.

(1087)

1921. THE EUROPEAN RED MITE, A NEW ORCHARD PEST IN CONNECTICUT (PARATETRANYCHUS PILOSUS CAN. AND FANZ.) Conn. Agr. Expt. Sta. Bull. 226, pp. 184-189, illus. [Abstract in Rev. Appl. Ent. (A) 9: 293. 1921.]

In Oregon a combination of nicotine sulphate and lime-sulphur or scalecide has been found very effective.

-DE LONG, D. M.

(1088)

1923. RESULTS OF SPRAYING AND DUSTING FOR THE CONTROL OF THE RED SPIDER (PARATETRANYCHUS PILOSUS). Jour. Econ. Ent. 16: 88-90. [Abstract in Rev. Appl. Ent. (A) 11: 226-227. 1923.]

Various combinations of sulphur dust which have been tried against this pest on prunes in New York State, all of which destroyed from 50 to 60 percent of the insects. The addition of nicotine, lead arsenate, or lime and lead arsenate did not apparently increase the efficacy.

HAMILTON, C. C.

(1089)

1926. THE EUROPEAN RED MITE. N. J. Agr. Expt. Sta. Circ. 187, 8 pp. [Abstract in Rev. Appl. Ent. (A) 14: 297. 1926.]

Lime sulphur (1:9) even with the addition of nicotine sulphate (1:500) was unsatisfactory against Paratetranychus pilosus C. & F., as over 30 percent of the eggs hatched.

DRIGGERS, B. F.

(1090)

1928. EFFECT OF EARLY SUMMER AND LATE SUMMER WHITE OIL AND NICOTINE SULPHATE SPRAYS ON THE NUMBER OF EGGS OF THE EUROPEAN RED MITE OVER-WINTERING ON PEACH TREES. Jour. Econ. Ent. 21: 878-882. [Abstract in Rev. Appl. Ent. 17: 180. 1929.]

Five applications of nicotine sulphate (1:800) or 1 percent white oil emulsion on peaches in May and June failed to prevent the

deposition of a number of eggs by the European red mite (Paratetranychus pilosus C. & F.), and three applications in August of ground tobacco dust produced no reduction in the number of eggs overwintering. Four applications in August of nicotine sulphate (1:800) gave a reduction of 29 percent, and 1 percent oil emulsion applied four times in August gave a reduction of 98.9 percent in the number of overwintering eggs.

MASSE, A. M.

(1091)

1929. THE FRUIT TREE RED SPIDER (OLIGONYCHUS ULMI C. L. KOCH). East Malling Res. Sta. Rept. 1928, 16 (1): 110-122. [Abstract in Rev. Appl. Ent. (A) 17: 500-501. 1929.]

Paratetranychus pilosus C. & F., of which the author considers Oligonychus ulmi Koch to be an earlier name, has considerably increased on fruit trees during recent years. This is considered to be due to the general and continued use of tar distillate winter washes which either destroy or drive away hibernating insects that prey on it and to the consequent disuse of many of the routine sprays of sulphur and nicotine which are toxic to mites.

GARMAN, P.

(1092)

1930. A STUDY OF VARIOUS OILS AND EMULSIONS FOR KILLING THE EGGS OF THE EUROPEAN RED MITE. EXPERIMENTS WITH OILS ON A DOUBLE INFESTATION OF APHIDS AND EUROPEAN RED MITES AT THE EXPERIMENT FARM AT MOUNT CARREL. Conn. Agr. Expt. Sta. Bull. 315, pp. 571-575; 576-578. [Abstract in Rev. Appl. Ent. (A) 18: 544-545. 1930.]

Best results in field experiments against aphids were obtained with lime-sulphur (12:100) containing nicotine sulphate (1:400); the combinations of oil emulsion with nicotine sulphate or free nicotine (1 1/2 :300) ranking next.

In the case of the European red mite (Paratetranychus pilosus C. & F.) the order of effectiveness was the same.

RYLE, G. B.

(1093)

1925. THE CONIFER SPINNING MITE OR RED SPIDER, PARATETRANYCHUS (OLIGONYCHUS) UNUNGUIS, JACOBI. Quart. Jour. Forestry 19 (1): 31-39, illus. [Abstract in Rev. Appl. Ent. (A) 13: 59-60. 1925.]

Nicotine was quite ineffective against the above mite.

WAHL, R.

(1094)

1916. CONTROL OF TETRANYCHUS SPP. Mitt. Landw.-Bakteriol. u. Pflanzenschutzsta., Vienna, 12 pp., illus. [In German. Abstract in Rev. Appl. Ent. (A) 8: 262. 1920.]

Measures advocated for the red spider include the application of quassia, nicotine, and lime-sulphur sprays, the last being considered the most efficacious.

CAMPBELL, J. A.

(1095)

1917. WORK FOR THE COMING MONTH. THE ORCHARD. Jour. Agr. Wellington, New Zealand 14 (4): 308-311, April 20, 1917; 15 (5): 221-226, October 20. [Abstract in Rev. Appl. Ent. (A) 6: 95-96. 1918.]

For woolly aphids (Eriosoma lanigerum) Black Leaf 40 (1:800) combined with lead arsenate is recommended. For red mites (Tetranychus) Black Leaf 40 (1:900) combined with arsenate of lead is recommended.

GALIARD, L.

(1096)

1920. STRAWBERRY CULTURE AROUND SYDNEY. Agr. Gaz. N. S. Wales 31 (11): 815-820, illus. [Abstract in Rev. Appl. Ent. (A) 9: 88-89. 1921.]

A nicotine spray is effective against red spiders (Tetranychus) on strawberry leaves where it can be applied without interfering with the fruit, but plenty of water is perhaps the best remedy.

GIACCONE, V.

(1097)

1921. JULUS AND TETRANYCHUS. Uruguay Minist. Ind. Def. Agr., Bol. Mens., 2 (4): 114-115, illus. [In Spanish. Abstract in Rev. Appl. Ent. (A) 10: 227. 1922.]

Against Tetranychus a 3 percent solution of soap or a solution of tobacco extract will give good results.

MCGREGOR, E. A.

(1098)

1913. THE RED SPIDER ON COTTON. U. S. Dept. Agr. Bur. Ent. Circ. 172, 22 pp., illus. [Abstract in Rev. Appl. Ent. (A) 1: 353-354. 1913.]

Against Tetranychus bimaculatus Harvey on cotton in South Carolina the following spray mixture was successfully used: 2.5 gal. miscible oil, 26 oz. 40-percent nicotine sulphate, and water to make 100 gal. in all.

PARKER, W. B.

(1099)

1913. THE RED SPIDER ON HOPS IN THE SACRAMENTO VALLEY OF CALIFORNIA. U. S. Dept. Agr. Bur. Ent. Bull. 117, 41 pp., illus.

Sprays containing 40-percent nicotine sulphate (p. 26) killed as high as 98.9 percent of the mites (Tetranychus bimaculatus Harvey) treated, but they are not recommended for practical control work.

MCGREGOR, E. A.

(1100)

1914. RED SPIDER CONTROL. Jour. Econ. Ent. 7 (4): 324-336.

One of the effective sprays used against this spider (Tetranychus bimaculatus Harvey) on cotton was miscible oil combined with Black Leaf Tobacco Extract.

SCHNEIDER, N.

(1101)

1904. CULTURE FORCÉE DES FIGUIERS EN POTS. Rev. Hort. 76: 571-573.

Against the red spider (Tetranychus telarius) and aphids on fig-trees the following spray mixture was effective: 2 l. nicotine, 125 g. black potassium soap, 100 g. sodium carbonate, and 100 l. water.

BELLAIR, G.

(1102)

1911. L'ACARIEN DES SALVIAS. Rev. Hort. 83: 230-231.

Good results were obtained by dipping Salvia, infested with red spider (Tetranychus telarius), in the following mixture: 10 l. water, 100 cc. rich tobacco juice, 100 cc. wood alcohol, 100 g. black soap, and 100 g. sodium carbonate.

MCGREGOR, E. A., and McDONOUGH, F. L.

(1103)

1917. THE RED SPIDER ON COTTON. U. S. Dept. Agr. Bull. 416, 72 p., illus. [Abstract in Rev. Appl. Ent. (A) 5: 242-244. 1917.]

For the control of the red spider [Tetranychus telarius L (= bimaculatus Harvey)] nicotine sulphate 1/2 to 1/4 lb. fish-oil soap with 2 gal. water was found a perfect spray, and nicotine sulphate (1:500) and a miscible oil (1:40) also caused complete mortality. These sprays do not destroy the eggs. In spraying it is necessary to hit the entire underside of every leaf of an infested plant.

SEVERIN, H. C.

(1104)

1919. TENTH ANNUAL REPORT OF THE STATE ENTOMOLOGIST OF SOUTH DAKOTA FOR THE PERIOD ENDING 30TH JUNE 1919. S. D. State Col., pp. 1-36, illus. [Abstract in Rev. Appl. Ent. (A) 8: 217-218. 1920.]

Against currant aphids (Myzus rubis L.) and mites (Tetranychus telarius L.) 40-percent nicotine sulphate (1 : ,1000) with soap was advocated.

VOGELWEID, V.

(1105)

1922. THE DEVASTATION OF HOP FIELDS OF THE LOWER RHINE BY TETRANYCHUS TELARIUS L. Bull. Assoc. Philomathique d'Alsace et de Lorraine, 6 (1921), pt. 3, pp. 71-89, illus. Saverne. [In French. Abstract in Rev. Appl. Ent. (A) 10: 631. 1922.]

Sprays of nicotine, black soap, and spirits of wine are efficacious if used at the correct periods in the life-cycle of the above red spider.

ANONYMOUS

(1106)

1926. THE CHIEF ENEMIES OF LUCERNE IN ARGENTINA. Arg. Min. Agr. Circ. 645, 19 pp., illus. [In Spanish. Abstract in Rev. Appl. Ent. (A) 14: 623. 1926.]

Against the mite (Tetranychus telarius L.) spraying with tobacco-soap is quite effective.

TEMPLE, W.

(1107)

1929. INJURY TO CACTUS PLANTS BY SUCKING INSECTS AND ITS PREVENTION. *Kranke Pflanze* 6 (4-5): 63-65, 85-87, illus. [In German. Abstract in *Rev. Appl. Ent.* (A) 17: 486. 1929.]

Sprays of lime-sulphur (with or without 1.5 percent tobacco extract) or nicotine and soap are effective against the red spider (Tetranychus telarius L.). Nicotine sprays are effective against a bug, probably the capsid Tenthecoris bicolor Scott.

ZATTLER

(1108)

1929. WORK AGAINST THE RED SPIDER IN HOP CULTIVATION. *Allg. Brau-u. Hopfenztg.* 69, pp. 981. [In German. Abstract in *Rev. Appl. Ent.* (A) 18: 267. 1930.]

The red spider (Tetranychus telarius L.) infesting hops may be controlled by a spray containing 1.5 percent soft soap and 0.5 percent tobacco extract.

BREAKEY, E. P.

(1109)

1934. HALOWAX AS A CONTACT INSECTICIDE. *Jour. Econ. Ent.* 27: 393-398, illus.

In the comparative tests conducted, Black Leaf 40 (1 : 800) without soap killed the following percentages: Macrosiphum sanborni, 100; M. ribelum, 80; Aphis spiraeicola, 65; Tetranychus telarius, 33; Thrips tabaci, 0.

MOZNETTE, G. F.

(1110)

1921. DUSTING VS. SPRAYING FOR THE CONTROL OF INSECT PESTS ON THE AVOCADO. *Jour. Econ. Ent.* 14: 465-469.

Liquid lime-sulphur solution (1 : 50) when combined with Black Leaf 40 (1 : 900) proved to be the most satisfactory combination used in combating the avocado red spider (Tetranychus yothersi McGregor), the greenhouse thrips (Heliothrips hemerhoidalis Bouche), and leaf-hopper (Empoasca minuenta Ball), and remained effective against the red spiders over as long a period as did the lime-sulphur solution applied alone.

(1111)

1922. THE RED SPIDER ON THE AVOCADO. *U. S. Dept. Agr. Bull.* 1035, 16 pp., illus. [Abstract in *Rev. Appl. Ent.* (A) 10: 396-397. 1922.]

1905. DIE ROTE SPINNE AN GURKEN. Möller's Deut. Gärtner-Zeitung 20: 250-251.

The spreading of the red spider in greenhouses is due primarily to too dry air. Introduce moisture into the greenhouse and dust the plants, particularly cucumbers, with tobacco dust.

EWING, H. E.

(1113)

1914. THE COMMON RED SPIDER OR SPIDER MITE. Oreg. Agr. Expt. Sta. Bull. 121, 95 pp., illus. [Abstract in Rev. Appl. Ent. (A) 3: 63-64. 1915.]

Nicotine and emulsion sprays are preferable to the sulphur and lime-sulphur sprays.

GARMAN, P.

(1114)

1923. WORK WITH THE EUROPEAN RED MITE IN 1922. Conn. Agr. Expt. Sta. Bull. 247, pp. 333-338. [Abstract in Rev. Appl. Ent. (A) 11: 556. 1923.]

Fish-oil soap, laundry soap and sulphur, linseed oil emulsions, and lime-sulphur combined with lead arsenate and nicotine sulphate gave control in 1922. A dust containing nicotine, lead arsenate, and sulphur was not effective.

It is not necessary to add nicotine sulphate to fish-oil soap, though the addition of it would help in controlling aphids.

VOSBURY, E. D., WINSTON, J. R., and PYNAERT, L.

(1115)

1925. PINEAPPLE CULTIVATION IN FLORIDA. Bull. Agr. Congo Belge 16: 208-239, illus. [In French.]

Farmers Bulletin 1237 of the U. S. Dept. Agr. was translated and adapted to the conditions of the Belgian Congo. In regard to insect pests on pineapples, only the red spider and wooly aphid are considered of economic importance in Florida, and they are easily controlled by a small quantity of tobacco dust dusted upon the infested plants (p. 230).

THOMAS, P. H.

(1116)

1926. CONTROL OF RED SPIDER. Fruit World of Australasia 27 (4): 188-189. [Abstract in Rev. Appl. Ent. (A) 14: 364. 1926.]

For summer treatment oil emulsion (1 : 60), nicotine sulphate (1 pt. to 50 gal.), and atomic sulphur (1 lb. to 12 gal.) were tried. The results with the nicotine sulphate were very disappointing, even at a strength of 1 pt. to 30 gal.

MASSEE, A. M.

(1117)

1927. NOTES ON INSECTS AND OTHER PESTS IN 1925. E. Malling Res. Sta. Ann. Rept. 1925, 13 (2), sup., pp. 157-160. [Abstract in Rev. Appl. Ent. (A) 15: 484-485. 1927.]

On a plot sprayed with 100 gal. Bordeaux mixture (8: 8: 100) containing 4 lb. lead arsenate and 6 oz. nicotine, the infestation remained heavy, while on the plot sprayed with lime-sulphur (1: 30) and similar quantities of lead arsenate and nicotine the red spiders were controlled to a very large extent.

NEWCOMER, E. J., and YOTHERS, M. A.

(1118)

1927. EXPERIMENTS FOR THE CONTROL OF THE EUROPEAN RED MITE AND OTHER FRUIT-TREE MITES. U. S. Dept. Agr. Tech. Bull. 25, 33 pp., illus. [Abstract in Rev. Appl. Ent. (A) 16: 432-433. 1928.]

Nicotine sulphate at 1 to 800 with casein-lime as a spreader killed less than 50 percent of the mites, but mixed with potash-fish-oil soap was very effective; since the soap kills most of the mites it is not necessary to use the nicotine unless aphids are also present.

HEADLEE, T. J., and GINSBURG, J. M.

(1119)

1929. STUDIES OF COMBINED SPRAYS FOR DESTROYING THE OVERWINTERING EGGS OF THE EUROPEAN RED MITE AND APPLE APHIDS AT THE DELAYED DORMANT PERIOD OF THE APPLE TREE. N. J. Agr. Expt. Sta. Bull. 469: 1-15. [Abstract in Chem. Abs. 24: 455-456. 1930.]

Oil emulsion with the addition of free nicotine destroys approximately 100 percent of the eggs of both species and does not injure the trees. The volatility of nicotine is greater from free nicotine than from nicotine sulphate solutions when mixed with either lime-sulphur (1:9) or oil emulsion (3 percent oil). The toxicity to aphid eggs parallels the volatility. A higher percentage of nicotine is evolved from nicotine sulphate mixed with lime-sulphur than with oil emulsion. In 72 hours only about 25 percent of the nicotine was volatilized from 0.1 percent solution in the presence of both lime-sulphur and oil emulsion.

2. Other Mites, 1902-1933

PESCOTT, E. E.

(1120)

1915. ORCHARD AND GARDEN NOTES. Victoria Dept. Agr. Jour. 13: 124-126. [Abstract in Rev. Appl. Ent. (A) 3: 362. 1915.]

Young deciduous fruit trees attacked by woolly aphid or Bryobia mites should be sprayed with nicotine solution or resin wash after the crop has been gathered.

WEBSTER, F. M.

(1121)

1912. THE CLOVER MITE (BRYOBIA PRATENSIS GARMAN). U. S. Dept. Agr. Bur. Ent. Circ. 158, 5 pp., illus.

Tobacco preparations applied in the form of a liquid spray are quite effective in destroying this mite on grasses, but do not destroy the eggs, and therefore offer only temporary relief (p. 4).

TRÄGÅRDH, I.

(1122)

1915. CONTRIBUTIONS TOWARD THE KNOWLEDGE OF THE SPINNING-MITES. Medd. Lande No. 109 Centralanst. Försöks. Jordbr., Stockholm, Ent. Adv. no. 20. [In Swedish. Abstract in Rev. Appl. Ent. (A) 3: 252-254. 1915.]

Spraying with quassia and nicotine emulsions gives good results, not only against the greenhouse spinning-mite (Tetranychus althacae von Hanstein), but also against the fruit-tree mite (Paratetranychus pilosus C. and F.). Nicotine was also used against the gooseberry mite (Bryobia praetiosa K.).

HIGGINS, J. E.

(1123)

1917. THE LITCHI IN HAWAII. Hawaii Agr. Expt. Sta. Bull. 44, 21 pp., illus. [Abstract in Rev. Appl. Ent. (A) 5: 553. 1917.]

A mite, apparently an undescribed species of Eriophyes, attacking the litchi (Litchi chinensis) can be practically eradicated by spraying with a solution of 10 oz. nicotine sulphate and 1 3/4 lb. whale oil soap in 50 gal. water.

PARKER, W. B.

(1124)

1928. THE BUD FORM OF THE PEAR LEAF BLISTER MITE. Blue Anchor 5 (12): 20-21, 73, illus. [Abstract in Rev. Appl. Ent. (A) 17: 228. 1929.]

Lime-sulphur, nicotine and soap or spreader, or foliage oils are capable of killing all the pear leaf blister mites (Eriophyes pyri Fgst.) when they can be reached with the spray; but they are so well protected by the foliage that the time of application is of more importance than the material used.

MUTH, F.

(1125)

1917. THE MITE DISEASE OF VINES, A NEW AND DANGEROUS DISEASE OF OUR VINEYARDS DUE TO ERIOPHYES VITIS NAL. AND SOME NOTES ON SIMILAR SHORT DEFORMATIONS. Ztschr. Pflanzkrank. 27 (4): 205. 1917. [Abstracts in Hess. Landw. Ztschr. 1916, pp. 442-443; 458-459; and in Rev. Appl. Ent. (A) 6: 6. 1918.]

Nicotine soft soap (1: 1: 100) or Muth's solution (1:100) should be used against Eriophyes (Phyllocoptes) vitis Nal.

NEWMAN, L. J.

(1126)

1923. RED-LEGGED VELVET EARTH MITE (NOTOPHALLUS BICOLOR FROG.). West Aust. Dept. Agr. Bull. 106, 4 pp., illus. [Abstract in Rev. Appl. Ent. (A) 11: 571-572. 1923.]

The cape weed, Cryptostemma calendulaceum, is the chief food plant; various vegetables, oats, lucerne, and clovers are also attacked. Seedlings should be dipped in tobacco water before planting out. The only sprays found effective were nicotine emulsion or kerosene emulsion containing naphthalene.

(1127)

1925. THE RED-LEGGED EARTH MITE. West. Australia. Dept. Agr. Jour. 2 (3): 354. [Abstract in Rev. Appl. Ent. (A) 14: 50. 1926.]

Tobacco dust, 3 lb. plus 15-percent carbolic powder, 1 lb., may be used at the rate of 1 cwt. per acre for the control of Notophallus bicolor Frogg.

JACK, R. W.

(1128)

1908. THE EARTH FLEA. Agr. Jour. Cape of Good Hope 32: 615-620, illus.

This pest is a mite, and feeds on winter vegetables in South Africa. It may be controlled by using a tobacco decoction. Boil 1 lb. tobacco in 1 gal. water for 1 hour, and dilute the extract 1 to 80.

SKINNER, H. B.

(1129)

1927. REPORT OF THE DATE PALM INSPECTOR FOR 1923-1924. Ariz. Com. Agr. & Hort. 15th & 16th Repts. pp. 50-58, illus. [Abstract in Rev. Appl. Ent. (A) 15: 593. 1927.]

The mite Paratetranychus heteronychus Ewing can be controlled by a dust containing nicotine and sulphur. Asarcopus palmarum was effectively controlled with a nicotine spray.

CUNLIFFE, N., and RYLE, G. B.

(1130)

1923. THE CONIFER SPINNING MITE ON SITKA SPRUCE, OLIGONYCHUS (PARATETRANYCHUS) UNUNGUIS JACOBI. Quart. Jour. Forestry 17 (1): 359-362, illus. [Abstract in Rev. Appl. Ent. (A) 11: 110. 1923.]

Soap solution, quassia-nicotine emulsion, or lime-sulphur sprays have been successfully used in Sweden.

JORDAN, K. H. C.

(1131)

1918. THE GALL MITE OXYPLEURITES CARINATUS ITS DAMAGE AND ITS CONTROL.

Ztschr. Angew. Ent. 4 (2): 238-266, illus. [Abstract in Rev. Appl. Ent. (A) 8: 268. 1920.]

Nicotine sprays have proved effective against these mites on horse-chestnut trees (Aesculus hippocastanum).

TUCKER, R. W. E.

(1132)

1925. THE BLACK SAND MITE (PENTHALEUS DESTRUCTOR, TKR.). Union S. Afr. Dept. Agr. Jour. 10 (3): 269-270. [Abstract in Rev. Appl. Ent. (A) 13: 268-269. 1925.]

The mites may be killed by spraying with tobacco extract, 1 part in 80 parts of water.

BRITTAİN, W. H.

(1133)

1917. TWO APPLE LEAF MITES OF ECONOMIC IMPORTANCE. Canad. Ent. 49 (6): 185-189. [Abstract in Rev. Appl. Ent. (A) 5: 388. 1917.]

Phyllocoptes schlechtendali (silver-leaf or rusty-leaf mite) and Eriophyes malifoliae (apple leaf mite) are both readily destroyed by weak solutions of nicotine sulphate.

STELLWAAG, F.

(1134)

1919. INCREASE OF MITE-INFESTATION ON VINES IN THE BAVARIAN RHINE PALATINATE. Ztschr. Angew. Ent. 5 (1): 128. [In German. Abstract in Rev. Appl. Ent. (A) 8: 272. 1920.]

In regard to mites (Phyllocoptes vitis), the remedial measures advocated include spraying with a nicotine and soap solution mixed with a copper-lime spray.

FAES, H.

(1135)

1905. ACARIOSE, DIT COURT-NOUE; BRUNISSURE ET ERINOSE. Chron. Agr. Canton de Vaud 18 (16): 379-396, illus.

A spray solution, consisting of 2 percent soap and 1 percent strong tobacco juice, gave good results against the grape mite (Phytoptus vitis) (p. 394).

MASON, F. A.

(1136)

1922. A BULB PEST. Bur. Bio-Tech. (Leeds) Bull. 5, pp. 150-151, illus. [Abstract in Rev. Appl. Ent. (A) 10: 296. 1922.]

The bulb mite Rhizoglyphus echinopus F. & R. can be destroyed without injury to the flower if the bulb is immersed before planting in a solution of 1 oz. of nicotine-petroleum emulsion in 1 gal. of water.

After immersion for one minute the bulbs should be allowed to drain before being planted, and as a further precaution they should be sprayed with the same mixture at two or three intervals between potting and flowering.

GARMAN, P.

(1137)

1921. A STUDY OF THE BULB MITE (RHIZOGLYPHUS HYACINTHIS BANKS). Conn. Agr. Expt. Sta. Bull. 225 (Ent. Ser. no. 28), pp. 115-132, illus. [Abstract in Rev. Appl. Ent. (A) 9: 241. 1921.]

Dipping the bulbs in nicotine sulphate 1:400, or nicotine oleate heated to 122°F., or even water at the same temperature is a satisfactory method of killing the mites.

DAHLGREN, E.

(1138)

1926. SOME IMPORTANT GREENHOUSE PESTS. Iowa Hort. Soc. Rept. 1925, 60: 187-192. [Abstract in Rev. Appl. Ent. (A) 17: 71. 1929.]

The most successful treatment for bulbs infested with the bulb mite (Rhizoglyphus hyacinthi Boisd.) is to immerse them for 10 minutes in a solution of 40-percent nicotine sulphate (1:400) heated to 122°F.

McDANIEL, E. I.

(1139)

1928. THE PRINCIPAL BULB PESTS IN MICHIGAN. Mich. Agr. Expt. Sta. Spec. Bull. 173, 23 pp., illus. [Abstract in Rev. Appl. Ent. (A) 16: 557-558. 1928.]

Most of the bulb mites (Rhizoglyphus hyacinthi Bdv) are killed when bulbs are left for 10 min. in 40-percent nicotine sulphate (1:400) heated to 122°F., though bulbs so treated often fail to flower.

BRITTON, W. E., WALDEN, B. H., and LOWEY, Q. S.

(1140)

1915. EXPERIMENTS IN CONTROLLING A MITE (TARSONEMUS PALLIDUS BANKS) INJURING SNAPDRAGON PLANTS IN THE GREENHOUSE. Conn. Agr. Expt. Sta. Rept. 1914: 176-179. [Abstract in Rev. Appl. Ent. (A) 3: 372. 1915.]

Black Leaf 40, 5 cc. to 1 gal. water with naphtha soap added in the proportion of 4 lb to 100 gal. water applied 4 times at intervals of a week controlled Tarsonemus pallidus.

MOZNETTE, G. F.

(1141)

1917. THE CYCLAMEN MITE. Jour. Agr. Res. 10: 373-390. [Abstract in Rev. Appl. Ent. (A) 5: 507-508. 1917.]

Black Leaf 40 has been used successfully and safely to control the cyclamen mite (Tarsonemus pallidus Banks) on cyclamen, chrysanthemum, and snapdragon plants at the strength of 1:1,000 with the addition of a

small quantity of soap. This should be first applied when the plants are transplanted having grown about 1 to 1 1/2 in. high and the treatment should be repeated at 10-day intervals until the flower buds begin to show color.

D[UARDIN], F. (1142)

1919. LA MITE DU CYCLAMEN DE PERSE. Rev. Hort. 91: 256.

Against the mite (Tarsonemus pallidus) on cyclamens the following spray mixture is recommended: 28 g. soap, 1 teaspoonful nicotine, and 4 l. water. The spraying should be repeated several times at 10-day intervals.

DUSTAN, A. G., and MATTHEWMAN, W. G. (1143)

1932. SOME NOTES ON THE CYCLAMEN MITE (TARSONEMUS PALLIDUS BANKS), A PEST OF STRAWBERRY PLANTS. Ent. Soc. Ont. 62nd Ann. Rept. 1931, pp. 34-37. [Abstract in Rev. Appl. Ent. (A) 21: 279. 1933.]

Nicotine sulphate, used as a dip, and tobacco dusts were valueless as means of control.

MUNGER, F. (1144)

1933. INVESTIGATIONS IN THE CONTROL OF THE CYCLAMEN MITE (TARSONEMUS PALLIDUS BANKS.) Minn. Agr. Expt. Sta. Tech. Bull. 93, 20 pp. [Abstract in Rev. Appl. Ent. (A) 22: 420. 1934.]

Fumigation with pure nicotine or pyridine showed some promise, and there is evidence that the repellent effect of frequent nicotine sprays keeps plants free from infestation, but it was concluded that hot water treatment is the only method practical for eradicating the mites from infested plants.

SCHOEVERS, T. A. C. (1145)

1929. AN UNUSUAL INJURY BY MITES TO YOUNG CUCUMBER PLANTS. Versl. Meded. Plantenziektenk. Dienst., no. 56, pp. 4-7, illus. [In Dutch. Abstract in Rev. Appl. Ent. (A) 17: 638-639. 1929.]

Fumigation with nicotine is the remedy suggested for the mite Tyroglyphus dimidiatus Herm.

BUSCK, A. (1146)

1902. NOTES ON ENEMIES OF MUSHROOMS AND ON EXPERIMENTS WITH REMEDIES. U. S. Dept. Agr. Div. Ent. Bull. 38, pp. 32-35.

Tobacco dust was tried in a single bed, and gave negative results, acting at most only as a deterrent, but not killing the mites (Tyroglyphus lintneri) on mushrooms.

TRÄGÅRDH, I.

(1147)

1916. OUR MOST COMMON SPINNING MITES AND THEIR CONTROL. Centralanst. Försöks. Jordbr. Stockholm, Flygblad No. 58. Ent. Avd. No. 13, 4 pp., illus. [In Swedish. Abstract in Rev. Appl. Ent. (A) 4: 353. 1916.]

Frequent spraying of the plants with water is very useful in hothouses, as well as spraying with quassia or nicotine.

ROSS, W. A.

(1148)

1917. THE CYCLAMEN MITE. Canad. Agr. Gaz. 4 (3): 174-175, illus. [Abstract in Rev. Appl. Ent. (A) 5: 264. 1917.]

To control the above pest, the plants should be sprayed with nicotine solution when they are first transferred to pots, and again at 10-day intervals until the buds are formed.

YOTHERS, W. W., and MASON, A. C.

(1149)

1930. THE CITRUS RUST MITE AND ITS CONTROL. U. S. Dept. Agr. Tech. Bull. 176, 56 pp., illus. [Abstract in Rev. Appl. Ent. (A) 19: 86-88. 1931.]

Tobacco, nicotine dust, and oil sprays have not given sufficient control to prove profitable.

J. EXTERNAL PARASITES ON MAN AND ANIMALS, 1866-1931.

PROWAZEK, S. VON

(1150)

1915. NOTES ON THE BIOLOGY AND CONTROL OF BODY LICE. Munch. Med. Wchnschr. p. 67. [In German. Abstract in Rev. Appl. Ent. (A) 3: 204. 1915.]

Tobacco decoction is included among the materials recommended.

STANTCHINSKI, V. V.

(1151)

1922. PRELIMINARY REPORT ON PEDICULUS HUMANUS AND ITS CONTROL. Bull. Moscow Ent. Soc. 2 (1): 99-128. [In Russian. Abstract in Rev. Appl. Ent. (B) 11: 79. 1923.]

The possibility of producing louse-proof clothes was tried, and in this connection nicotine fumigation was most effective. Finely ground tobacco, mixed with slaked lime and water, was put in a dish and held over a fire, and the cloth to be treated was held over the dish. Tobacco residues were also used. Many of these tests proved to be contradictory, the lice disappearing rapidly in some cases, whereas, in others their diminution was not appreciable.

FLETCHER, W.

(1152)

1927. ANNUAL REPORT OF THE INSTITUTE FOR MEDICAL RESEARCH FOR THE YEAR 1926. Med. Dept. F.M.S. Rept. 1926, pp. 31-52. [Abstract in Rev. Appl. Ent. (B) 16: 121-122. 1928.]

A mixture of cajeput and tobacco juice has been recommended as a repellent for the mite causing tsutsu-gamushi disease. This mixture is smeared on the bodies of laborers clearing away the weeds and undergrowth in which rats live.

DINWIDDIE, R. R.

(1153)

1892. PARASITISM OF DOMESTIC ANIMALS. Ark. Agr. Expt. Sta. Univ. Bull. 20, 31 pp.

Tobacco infusion made according to a formula often prescribed for scab on sheep was tested on several calves badly infested with ticks (Boophilus bovis Curtice = Ixodes bovis Riley) of all sizes. The calves were thoroughly washed all over with the infusion on two successive days. All the small ticks were killed, but the larger ones did not seem to be affected (p. 12).

CALZAVARA, G.

(1154)

1924. PARASITES INFESTING CHICKENS. Coltivatore 70 (2): 56. [In Italian.]

As a remedy against Cnemidocoptes gallinae on chickens prepare a bath consisting of three tablespoonfuls of tobacco extract, 180 g. sulphur, and 10 l. water. Dip the infested chickens in this mixture for 2 to 3 min.

ABBOTT, W. S.

(1155)

1920. RESULTS OF EXPERIMENTS WITH MISCELLANEOUS SUBSTANCES AGAINST CHICKEN LICE AND THE DOG FLEA. U. S. Dept. Agr. Bull. 838, 15 pp. [Abstract in Rev. Appl. Ent. (B) 9: 110. 1921.]

Nicotine powders cannot be relied upon for the destruction of lice on fowls at lower strengths than 1.15 or 1.25 percent, and even these require very careful application. A powder containing 4.56 percent tobacco powder was not completely effective against the dog flea Ctenocephalus canis Curt.

BRITAIN, W. H.

(1156)

1925. EXPERIMENTS IN THE CONTROL OF HEAD LICE (LIPEURUS HETEROGRAPHUS NITZSCH) ON YOUNG CHICKS, 1924. Acadian Ent. Soc. Proc. 1924, no. 10, pp. 41-42. [Abstract in Rev. Appl. Ent. (B) 13: 154. 1925.]

A pinch of pure tobacco dust gave complete control of this louse on young chickens.

WOOD, H. P.

(1157)

1920. TROPICAL FOWL MITE IN THE UNITED STATES, WITH NOTES ON LIFE HISTORY AND CONTROL. U. S. Dept. Agr. Circ. 79, 8 pp., illus. [Abstract in Rev. Appl. Ent. (B) 8: 75-76. 1920.]

The most effective remedial measures against the above mite (Liponyssus bursa) are a dip consisting of 2 oz. sulphur, 1 oz. soap, and 1 gal. water, or dusting with sulphur or pyrethrum, or dipping in a solution of 1 teaspoonful of 40-percent nicotine sulphate to 1 gal. water and about 1/3 oz. soap.

BUSHNELL, L. D., and BRANDLY, C. A.

(1158)

1929. POULTRY DISEASES, THEIR PREVENTION AND CONTROL. Kans. Agr. Expt. Sta. Bull. 247, 107 pp. [Abstract in Rev. Appl. Ent. (B) 18: 127, 1930.]

Nicotine sulphate is recommended against the lice Liponyssus bursa Berl. (tropical mite) and Dermanyssus gallinae DeG. (chicken mite) on fowls. It should be brushed on to the perches sufficiently early in the day for it to dry before the birds go to roost when the warmth of their bodies causes the nicotine to volatilize. At least three treatments are needed against L. bursa.

CUTRIGHT, C. R.

(1159)

1929. THE FEATHER MITE IN OHIO. Ohio Agr. Expt. Sta. Bimonthly Bull. 138, pp. 100-102, illus.

The perches in a small section of one of the houses were painted with nicotine sulphate about one-half hour before the chickens started to roost. Further tests showed that the birds were entirely freed of mites (Liponyssus sylviarum), but this method is not recommended to take the place of the other two which are considered the more reliable.

PAYNE, L. F.

(1160)

1930. FEATHER MITES AND THEIR CONTROL. Ala. Polytech. Inst. Bull. 25 (1): 61-63, illus. [Abstract in Biol. Abs. 6 (10): 2332. 1932. Entry 22684.]

Three applications, at weekly intervals, of nicotine sulphate on the upper surface of the roosting poles shortly before dusk was a convenient and satisfactory remedy for the feather mite Liponyssus sylviarum on fowls. This method eliminated the handling of the bird and it was found practical at all seasons.

TAYLOR, E. L.

(1161)

1930. LIPONYSSUS SYLVIARUM INJURING POULTRY IN THIS COUNTRY. Parasitology 22 (3): 313. [Abstract in Rev. Appl. Ent. (B) 18: 215. 1930.]

The perches were treated with nicotine sulphate and kerosene. The mites disappeared after a second treatment, and all the birds recovered, though some had been severely affected by the infestation.

BISHOPP, F. C., and WAGNER, R. D.

(1162)

1931. NICOTINE IN THE CONTROL OF ECTOPARASITES OF POULTRY. Jour. Econ. Ent. 24: 56-62. [Abstract in Rev. Appl. Ent. (B) 19: 139-140. 1931.]

Tests with Liponyssus sylviarum C. and F. indicate that a single treatment of the roosts with nicotine sulphate cannot be relied on to control an infestation. Nicotine sulphate was found to be very effective against Dermanyssus gallinae DeG. when applied pure or diluted with water. Most of the practical tests with mites were made by thoroughly spraying infested fowl houses with 1 part nicotine sulphate in 9 parts water and then closing them for about 8 hrs. Nicotine sulphate diluted 1 to 50 with 1 oz. soap per gal. added also gave satisfactory control.

Spraying the fowl houses with nicotine sulphate (1 : 9) was also found to be effective against Argas persicus Oken. Tests against Echidnophaga gallinacea Westw. showed that the application of nicotine sulphate to the perches did not destroy the adult fleas attached to the heads of the fowls, but spraying the floors of infested poultry houses with a dilution of 1 to 4-9 destroyed all the adults present.

In tests against lice (Eumenacanthus stramineus Nitz., Menopon gallinae L., Coniocotes gallinae Retz., Libeurus caponis L., and L. heterographus Nitz.) a large percentage was killed during the first night following an application of nicotine sulphate to the upper surface of the perches half an hour before the fowls went to roost. Some were killed on the second and third nights, but the eggs were not all killed.

Results secured with free nicotine were practically identical with those obtained with nicotine sulphate. The use of nicotine sulphate has advantages over the individual treatment of the birds with sodium fluoride in that it is more quickly applied and costs less owing to the smaller amount of labor involved.

MAW, W. A.

(1163)

1931. THE NORTHERN FOWL MITE, LIPONYSSUS SYLVIARUM, OF POULTRY. Sci. Agr. 9 (10): 710, Ottawa. [Abstract in Rev. Appl. Ent. (B) 19: 185. 1931.]

Nicotine sulphate applied to the roosts has not proved satisfactory in all cases, but may be more effective as a spray.

RENE, C.

(1164)

1917. SHEEP TICKS. Prog. Agr., Amiene 31 (1534): 275-276. [In French. Abstract in Rev. Appl. Ent. (B) 5: 122. 1917.]

As a remedy for parasites (Melophagus and Trichodectes) on sheep, the animals were dipped into a mixture consisting of 1/2 gal. titrated extract of nicotine and 100 gal. water. This mixture, however, was not the most efficacious one used.

DAVISON, A. G.

(1165)

1910. THE KED, OR SHEEP LOUSE. Agr. Jour. Cape of Good Hope 36: 393-400, illus.

Against the louse Melophagus ovinus the following dip gave good results: 35 lb. ground tobacco, 10 lb. sulphur, and 100 gal. water. The tobacco was steeped for 4 days, and the liquid was added to the sulphur. The mixture was heated to 110°F. and each sheep was immersed for 1 minute. It destroys the adult but not the puparia, thus a second dipping is necessary.

ARKELL, T. R.

(1166)

1917. GET RID OF THE TICKS. Agr. Jour. Dept. Agr., Victoria, Brit. Columbia. 2 (3): 47, 51, illus. [Abstract in Rev. Appl. Ent. (B) 5: 118. 1917.]

Dips containing tobacco give good results against the sheep tick (Melophagus ovinus).

IMES, M.

(1167)

1917. THE SHEEP TICK AND ITS ERADICATION BY DIPPING. U. S. Dept. Agr. Farmers' Bull. 798, 51 pp. [Abstract in Rev. Appl. Ent. (B) 5: 145-146. 1917.]

Detailed instructions for dipping sheep for the control of the sheep tick Melophagus ovinus in various dips, including the nicotine dip, are given.

BEDFORD, G. A. H.

(1168)

1926. THE SHEEP KED (MELOPHAGUS OVINUS LINNÉ). Jour. Dept. Agr. Union S. Afr. 12: 484-490, illus.

Dipping is the only treatment for this dipterous parasite on sheep. Six formulas are given, but only one includes nicotine. When the 10 long-woolled sheep were dipped in the McDougall's nicotine Lion Brand solution, no live keds could be found on the sheep 24 hours after the first dipping. Six days after the second dipping at 14 days interval two live keds were found. In spite of these good results, the author does not advise the use of a tobacco dip, but recommends one containing arsenic.

1866. LES POUX DU MOUTON. Jour. Agr. Prat. 2 (v. 30): 20-23, illus.

Boil 1/2 kg. tobacco leaves in 1 l. water for several hours, or soak this quantity in hot water for 24 hours. Put the tobacco water in a bottle with a perforated cork, and sprinkle the liquid on sheep infested with Pediculus ovis. This was found effective in Germany.

Wet the sheep infested with Pediculus ovis by using a mixture consisting of 1 kg. tobacco juice, 1/2 kg. green soap, and 60 g. sulphur. Dissolve the soap in water and add the tobacco juice and sulphur as indicated.

BISHOP, F. C.

(1170)

1929. THE PIGEON FLY- AN IMPORTANT PEST OF PIGEON IN THE UNITED STATES. Jour. Econ. Ent. 22: 974-980. [Abstract in Rev. Appl. Ent. (B) 18: 89. 1930.]

A high percentage of mortality of Pseudolynchia maura Bigot was secured with tobacco powder containing about 6 percent nicotine.

Nicotine sulphate (1:100) gave a high percentage of mortality and with addition of 1 ounce soap to 1 gal. of water destroyed all flies. Painting the nests and boxes with nicotine sulphate killed many flies but was injurious to the pigeons.

GABERT, H.

(1171)

1921. TRAITEMENT DES GALES DU LAPIN. Vie Agr. et Rur. 19 (53): 473-474, illus. [Abstract in Rev. Appl. Ent. (B) 10: 59-60. 1922.]

Tobacco extract (3 oz. tobacco to 5 pt. of water reduced to 1/3 by boiling) easily cures the early stage of mange of the ears in rabbits, which is caused by Psoroptes communis.

BEDFORD, G. A. H.

(1172)

1928. THE EFFECT OF VARIOUS DIPPING FLUIDS UPON THE OVIGEROUS FEMALES OF PSOROPTES COMMUNIS VAR. OVIS AND THEIR OVA. 13th & 14th Repts. Vet. Res. S. Afr. pt. 2, pp. 859-879. [Abstract in Rev. Appl. Ent. (B) 17: 90. 1929.]

The only dips that failed to destroy all the larvae after hatching were two proprietary nicotine fluids and lime-sulphur, and these killed the majority.

IMES, M.

(1173)

1916. SHEEP SCAB. U. S. Dept. Agr. Farmers' Bull. 713, 36 pp., illus.

The nicotine-sulphur dip recommended against the sheep scab (Psoroptes ovis) contains 0.05 percent nicotine and 2 percent sulphur. Sufficient nicotine for 96 gal. (about 800 lb.) of dip would therefore be furnished by 1 lb. of a 40-percent solution of nicotine. The formula for this dip would be 0.4 lb. nicotine, 16 lb. flowers of sulphur, and 96 gal. water (p. 25).

ANONYMOUS.

(1174)

1928. INSECTS AND PARASITES AFFECTING LIVESTOCK. Texas Agr. Expt. Sta. Ann. Rept. 40 (1927): 30-31. [Abstract in Rev. Appl. Ent. (B) 16: 263. 1928.]

A dip of nicotine sulphate at a strength of 0.065 percent and at 102.2° F. and holding the sheep in it for 3 min. was effective in controlling sheep scab mite (Psoroptes ovis Hering.). Sheep were dipped twice at intervals of from 7 to 17 days, all cases of scab disappearing with two dippings.

DU TOIT, P. J., and VILJOEN, P. R.

(1175)

1929. DIPPING AS A METHOD OF ERADICATING EAST COAST FEVER. S. Afr. Vet. Serv. 15th Rept. 1: 33-66. [Abstract in Rev. Appl. Ent. (B) 18: 177-178. 1930.]

Dipping cattle at intervals of 3 to 5 days is the officially recognized method of controlling African coast fever, the most important factor of which is Phipicephalus appendiculatus Neum. (brown tick). Of the preparations tested for hand dressing a mixture of 1 part tobacco (2 percent nicotine) and ten parts mineral oil gave the best results.

IMES, M.

(1176)

1918. CATTLE SCAB AND METHODS OF CONTROL AND ERADICATION. U. S. Dept. Agr. Farmers' Bull. 1017, 29 pp. [Abstract in Rev. Appl. Ent. (B) 7: 104-105. 1919.]

Nicotine dip is useful against sarcoptic scabies caused by Sarcoptes scabiei bovis and should be repeated about 4 times at intervals of 6 to 10 days.

Nicotine dips to be efficacious should be used at a strength of 1/20 of 1 percent nicotine. If used stronger they are injurious to cattle. They should be used as a temperature of 95-105° F. and flowers of sulphur may be added to them at the rate of 16 lb. to every 100 gal. of diluted dip.

MOHLER, J. R.

(1177)

1918. REPORT OF THE CHIEF OF THE BUREAU OF ANIMAL INDUSTRY. U. S. Dept. Agr., 63 pp. [Abstract in Rev. Appl. Ent. (B) 7: 91-92. 1919.]

Sarcoptic scabies (Sarcoptes scabiei var. bovis) can be eradicated by four dippings in lime-sulphur or nicotine, the interval between dippings being from 6 to 10 days.

IMES, M.

(1178)

1926. LICE, MANGE AND TICKS OF HORSES AND METHODS OF CONTROL AND ERADICATION. U. S. Dept. Agr. Farmers' Bull. 1493, 22 pp. [Abstract in Rev. Appl. Ent. (B) 15: 7-8. 1926.]

Dipping with nicotine is advised for destroying biting lice (Irichodectes vilosus Gieb. and I. parumpilosus Piag.) and the sucking louse Haematopinus asini L. Two dippings at an interval of 14 to 16 days may be necessary. Four to six dippings in a nicotine dip 5 to 7 days apart will usually effect a cure from sarcoptic mange caused by Sarcoptes scabiei equi Gerl.

CALER, H. L.

(1179)

1931. VOLCK SPECIAL EMULSION NUMBER 2 AS A CONTROL FOR EXTERNAL PARASITES OF ANIMALS. Kans. Ent. Soc. Jour. 4 (4): 77-98. [Abstract in Rev. Appl. Ent. (B) 19: 259-260. 1931.]

Pigs infested with Sarcoptes suis Gerl. were treated with a 10-percent emulsion of Volck oil made with water to which 40-percent nicotine sulphate had been added at the rate of 1/8 fl. oz. per gal.; skin scrapings taken 4 and 9 days after treatment showed the presence of oil but no mites. Subsequent scrapings at intervals of 3 days for 3 weeks were also negative, and the pigs improved steadily in health and weight.

BUYTON, F. E.

(1180)

1926. PRELIMINARY REPORT ON SODIUM FLUORIDE AS A CONTROL FOR CATTLE LICE. Jour. Econ. Ent. 19: 602-603. [Abstract in Rev. Appl. Ent. (B) 14: 186. 1926.]

Cattle treated with nicotine dust showed infestation 8 days after treatment. The lice present were Trichodectes scalaris (biting louse of cattle), Haematopinus eurysternus (short-nosed ox louse) and H. vituli (long-nosed ox louse.).

BISHOPP, F. C. and WOOD, H. P.

(1181)

1917. PRELIMINARY EXPERIMENTS WITH SODIUM FLUORIDE AND OTHER INSECTICIDES AGAINST BITING AND SUCKING LICE. Psyche 24(6): 187-189. [Abstract in Rev. Appl. Ent. (B) 6: 89. 1918.]

Nicotine sulphate (40-percent) at 1:800 killed all stages of lice.

GRAY, D. T.

(1182)

1917. REPORT OF THE ANIMAL INDUSTRY DIVISION. N. C. Agr. Expt. Sta. Ann. Rept. (1917) 40: 33-63. [Abstract in Rev. Appl. Ent. (3) 7: 87. 1919.]

Mites on poultry can be controlled by a nicotine solution free from the stems and leaves. Tobacco leaves in a dry state are useless. To prepare nicotine solution for this purpose 2 1/2 lb. of stems and leaves should be put in sufficient water to cover them, boiled for 1 hour, the liquid drained off and boiled down to 1/4 pt. which is then mixed with 4 oz. water in which has been placed 1 tablespoonful of nicotine with 1 qt. measure of plaster of paris. This should be stirred and passed through a fly-screen sieve, when it is ready for use.

BETO.

(1183)

1918. AVICULTURA. Rev. Fed. Bural, Montevideo 1 (4): 14-18, illus. [In Spanish.]

Against mites on poultry the following rubbing mixture is recommended in Uruguay: 30 g. borated vaseline, 15 g. flowers of sulphur, and 5 g. nicotine.

GOOD, E. S., and BRYANT, T. R.

(1184)

1911. THE DIPPING OF SHEEP FOR SCABIES IN TOBACCO DIPS WITH AND WITHOUT THE ADDITION OF FLOWERS OF SULPHUR. Ky. Agr. Expt. Sta. Bull. 157, pp. 183-193, illus.

It was concluded that the addition of flowers of sulphur in the prescribed dilutions of nicotine did not enhance the value of these dips in curing sheep of the diseases of scabies. The ruling requires that 0.07 percent of nicotine be used at each dipping.

RUFFIER, F.

(1185)

1918. SARNA DOS OVINOS E BANHO A BASE DE FUMO. Chacaras e Quintaes 17 (1): 50-51.

Against sheep ticks the following washing mixture is recommended in Brazil: 1 kg. tobacco leaves, 1 kg. flowers of sulphur, and 50 l. water. Soak the leaves in warm water for 24 hours and make the application in the evening, allowing the sheep to dry over night.

DIFFLOTH, P.

(1186)

1922. LES PARASITES EXTERNES DES MOUTONS. Vie Agr. et Rur. 11 (34): 146-149, illus.

Against sheep lice and ticks the following dipping mixture is recommended in France: 0.07 percent nicotine, 2 percent flowers of sulphur, and the remainder of 100 percent is water.

MOHLER, J. R.

(1187)

1922. REPORT OF THE CHIEF OF THE BUREAU OF ANIMAL INDUSTRY. U. S. Dept. Agr. 62 pp. [Abstract in Rev. Appl. Ent. (B) 11: 93. 1923.]

Lime-sulphur dip and nicotine dip afforded protection against sheep scab for 33 days, and nicotine dip with 2 percent flowers of sulphur gave protection for 69 days.

IMES, M.

(1188)

1928. SHEEP AND GOAT LICE AND METHODS OF CONTROL AND ERADICATION. U. S. Dept. Agr. Leaflet 13, 8 pp. [Abstract in Rev. Appl. Ent. (B) 16: 135. 1928.]

Lice may be controlled by dips of coal-tar creosote, tobacco or nicotine, and arsenicals. Arsenical dips are the most effective.

LEPLAE, E.

(1189)

1928. THE REARING OF SMALL DOMESTICATED STOCK. 1ST PART: SHEEP. Bull. Agr. Congo Belge 19 (3): 333-366, illus. [In French.]

Against lice on sheep in the Belgian Congo the following dipping or washing mixture is used after the sheep have been sheared: 2.5 kg. tobacco extract, 2.5 kg. flowers of sulphur, and 100 l. water. This solution is not caustic and gives good results (p. 348). The sheep may also be washed with a strong soap solution to which tobacco juice is added (p. 344).

MARESCALCHI, A.

(1190)

1905. L'ESTRATTO FENICATO DI TABACCO. Coltivatore 51: 698-699.

Against cattle lice a 3 to 4 percent solution of phenicated tobacco extract is recommended in Italy. Boil 60 g. of pipe tobacco in 1/2 l. water for 1/2 hour and add a little carbolic acid to the extract. Care should be taken that cattle do not lick themselves when treated, as symptoms of poisoning may appear in such cases.

SCELSI, S.

(1191)

1913. LICE ON CATTLE. Riv. Agr. [Parma.] 19 (15): p. 232. [In Italian. Abstract in Rev. Appl. Ent. (B) 1: 98-99. 1913.]

One of the remedies for lice on cattle is to wash the animals with a tobacco decoction made by boiling 50 g. of tobacco in 1,500 g. of water until it is reduced to one l.

ANONYMOUS.

(1192)

1915. THE DESTRUCTION OF LICE ON DOMESTIC ANIMALS. Agr. [Petrograd] 20 (6): 275. June. [In Russian. Abstract in Rev. Appl. Ent. (B) 3: 170. 1915.]

To destroy lice on domestic animals, 1/2 lb. of ordinary soap and 2 oz. of snuff tobacco are boiled in about 20 qt. of water till the whole of the soap is dissolved; 4 qt. of kerosene are then added to the boiling solution, stirred and allowed to cool into a jelly. For use, 1 part of this jelly is dissolved in 9 parts of warm water and rubbed into the coat of the animal with a piece of cloth; 4 or 5 days after the second application all the lice disappear.

KIRILLOV, L.

(1193)

1915. THE DESTRUCTION OF PARASITES ON CATTLE. Husbandry on the Don 10 (4): 169-170. [In Russian. Abstract in Rev. Appl. Ent. (B) 3: 115. 1915.]

Cattle attacked by parasites should be washed with a mixture prepared as follows: 1 lb. of tobacco leaves are boiled for 1 hour in 6 pt. of water, after which the leaves are removed and 2 pt. of weak spirits added to the decoction.

COOLEY, R. A., and PARKER, R. R.

(1194)

1916. CATTLE LICE IN MONTANA. Mont. Livestock Sanitary Bd & State Veter. Surgeon. Rept. 1915-1916, pp. 19-21. [Abstract in Rev. Appl. Ent. (B) 5: 41. 1917.]

Against lice on cattle dipping or spraying with tobacco decoctions is recommended.

CURASSON, G.

(1195)

1922. LA GALE CHLORIOPTIQUE DU BOEUF AU SENEGAL ET AU SOUDAN. Rec. Med. Vet. 98 (1): 14-19. January 15. [Abstracts in Trop. Vet. Bull. 10 (2): 39-40, 1922; and also in Rev. Appl. Ent. (B) 10: 158, 1922.]

The native method of treating mange in cattle comprises washing with urine that has undergone ammoniacal fermentation to clear the skin, and then using a decoction of the astringent bark of the baobab tree, tobacco leaves, and indigo.

ANONYMOUS.

(1196)

1931. TICKS AND TICK ERADICATION. Dept. Agr. Vet. Dept. Kenya, Bull. 13, 16 pp. Nairobi. [Abstract in Rev. Appl. Ent. (B) 19: 238. 1931.]

On farms heavily infected with African coast fever, the mortality can usually be checked by dipping the cattle every 3 or 5 days and hand-dressing regularly such parts as the insides of the ears, the tips of the tail, etc., from which the hair should be first clipped. The dressing mixtures recommended are equal parts of axle grease and kerosene, one part of tobacco extract to 5-6 of oil, or one part of solignum to five of oil; any cheap oil, such as crude engine oil or oil from the pump of a motor car, may be used.

ROOS, J.

(1197)

1915. PSOROPTIC MANGE IN THE HORSE. Tijdschr. Vergelijkende Geneeskunde, etc. 1: 252, 262, illus. [In Dutch. Abstract in Rev. Appl. Ent. (B) 7: 39-40. 1919.]

One of the remedies of horse mange is the application after the scabs and crusts have been removed, of tobacco decoction.

RENEE, C.

(1198)

1916. THE TREATMENT OF MANGE IN HORSES. Prog. Agr. 30 (1465): 84. [In French. Abstract in Rev. Appl. Ent. (B) 4: 70. 1916.]

A mixture, consisting of 1 lb. titrated nicotine extract, 1 $\frac{3}{5}$ oz. commercial soda crystals, and 2 gal. water, was recommended as a remedy for mange on horses. This may be applied with a brush or a sponge, but, owing to the danger of poisoning, the whole surface of the body should not be treated at one time.

(1199)

1917. THE TREATMENT OF MANGE ON HORSES. Prog. Agr. 31 (1522): 125-126. [In French. Abstract in Rev. Appl. Ent. (B) 5: 62-63. 1917.]

A mixture, consisting of 1 $\frac{3}{4}$ lb. titrated extract of nicotine to 2 oz. soda crystals and 3 $\frac{1}{2}$ gal. water, was used as a remedy for mange on horses. The advantage of this mixture is that no preliminary clipping is required.

CHAMPETIER.

(1200)

1918. LE TRAITEMENT DE LA GALE. Rec. Méd. Vet. 94 (12): 282-286. [Abstract in Rev. Appl. Ent. (B) 7: 167. 1919.]

The method here recommended for curing horse mange consists in clipping the whole body which is then sprayed with potassium polysulphide 40, sodium arsenate 2, nicotine (or an equivalent amount of tobacco extract) $\frac{1}{2}$, water 1,000, all parts by weight. An ordinary vineyard sprayer is suitable for the purpose. The spray is repeated on the fourth day and again on the seventh or eighth day.

CRIMI, P.

(1201)

1919. THE THERAPY OF SARCOPTIC MANGE OF EQUINES AND AN EFFICACIOUS, RAPID AND SIMPLE METHOD OF CURE. Ann. Staz. Sper. Malattie Infettive del Bestiame 5 (1918) no. 1, pp. 19-71. [In Italian. Abstract in Rev. Appl. Ent. (B) 8: 153. 1920.]

Horses affected with sarcoptic mange are clipped, washed with soft soap containing 4 percent creolin, and then rubbed with an ointment composed of flowers of sulphur 25, tobacco extract (Italian government brand) 5, and vaseline 100, all parts by weight. The application is

made on one side of the animal the other side being treated on the following day. Two days after this second application the animal is washed with ordinary soap and hot water.

GABERT, A.

(1202)

1920. GALE DES PATTES. Vie Agr. et Rur. 16 (18): 317, illus.
[Abstract in Rev. Appl. Ent. (B) 8: 127-128. 1920.]

Symbiotic mange may be treated by the application of a lukewarm solution consisting of ten drops nicotine to 1 $\frac{3}{4}$ pt of water.

GALLI-VALERIO, B.

(1203)

1916. CONTRIBUTIONS TO THE BIOLOGY AND CONTROL OF LICE. THIRD COMMUNICATION. Centrbl. Bakt. Parasit. u. Infektionskrank. 1te Abt. Orig. 74 (1); 33-35. [In German. Abstract in Rev. Appl. Ent. (B) 6: 76. 1918.]

The protective value of various substances against the bites of lice was investigated, basic nicotine (12-percent) alone proving of any use.

RITCHIE, A. H.

(1204)

1917. HOG LICE. Jour. Jamaica Agr. Soc. 21 (3): 91-92. [Abstract in Rev. Appl. Ent. (B) 5: 7E. 1917.]

Among the several measures for the destruction of hog lice, tobacco decoctions are mentioned.

MALLANAH, S.

(1205)

1918. TOBACCO, FLEAS AND PLAGUE. Indian Med. Gaz. 53 (2): 53-56.
[Abstract in Rev. Appl. Ent. (B) 6: 221. 1918.]

The leaves of tobacco spread on the floors of houses are said to kill fleas practically instantaneously. Sprinkling water on the tobacco once a day keeps it from crumbling and renders it more effective. Powdered tobacco should be introduced into rat holes which can then be firmly closed up with brick and mortar.

GILMER, P. M.

(1206)

1923. DERRIS AS A PARASITICIDE. Minn. State Ent. 19th Rept. (1921-1922): 41-29. [Abstract in Rev. Appl. Ent. (B) 12: 23. 1924.]

Derris powder is most effective when used at the rate of 20 percent with the addition of 80 percent tobacco dust.

EIDMANN, H.

(1207)

1925. DERRIS ALS PARASITICID. Anz. Schädlingkunde 1 (3): 31-32.

Against fleas and lice on animals a dust, consisting of 7.5 percent derris powder, 66.5 percent tobacco dust, and 25 percent powdered sulphur, was very effective. Licking off the dust is dangerous. Better results were obtained by using a mixture of 20 percent derris powder and 80 percent tobacco dust (p. 32).

K. DIPTERA, 1795-1934.

1. Flies as Pests of Man and Animals, 1795-1932

PERRET-MAISONNEUVE.

(1208)

1925. LE POU DES ABEILLES. Apiculture 69 (2): 34-37, illus. [Abstract in Rev. Appl. Ent. (A) 13: 97-98. 1925.]

Queen bees infested with Braula coeca may be rid of their parasites by picking them up and blowing a few puffs of tobacco smoke on them, when the parasites fall off and should be allowed to drop onto paper in which they can be burned. Similar fumigation measures will destroy many of the parasites in the hive itself, and they should be repeated 2 days later and a third time if necessary.

BAUTIER, L.

(1209)

1926. THE BEE LOUSE AND TOBACCO SMOKE/ Apicul. Rationelle 10 (10): 300-301. [In French. Abstract in Biol. Abs. 1 (4): 521. 1927. Entry 5,365.]

Experiments are recorded in the successful use of tobacco smoke in ridding bees, especially queens, of Braula coeca by the use of smoke.

HERROD-HEMPSALL, W.

(1210)

1931. THE BLIND LOUSE OF THE HONEY-BEE. Jour. Minist. Agr. 37 (12): 1176-1184, illus. [London]. [Abstract in Rev. Appl. Ent. (A) 19: 320-321. 1931.]

Driving tobacco smoke, which kills this fly in 1 to 2 min, through the hive should rid the colony of these pests (Braula coeca Nitz.). The brood chamber should be removed and the floor board brushed in order to remove any flies that might recover.

PARMAN, D. C., BISHOPP, F. C., LAAKE, E. W., COOKE, F. C., and ROARK, R. C. (1211)

1927. CHEMOTROPIC TESTS WITH THE SCREW-WORM FLY. U. S. Dept. Agr. Dept. Bull. 1472, 32 p.

Rabbit meat and beef liver, treated with 40-percent nicotine sulphate, were tested for 5 days in two Mason jars. The nicotine sulphate was of no value either as a repellent or in preventing infestation by this fly (Cochliomyia macellaria Fab.) (p. 5, 13, 25).

MAZZACCARA, G.

(1212)

1921. THE HORSE BOT. Allevamenti 2 (8): 238. [In Italian. Abstract in Rev. Appl. Ent. (B) 9: 176. 1921.]

The adult fly Gastrophilus intestinalis (equi) may be kept away from grazing animals by washing them with a solution of tobacco or other repellent.

MARLATT, C. L.

(1213)

1910. THE HORN FLY (HAEMATOBIA SERRATA ROB.-DESV.). U. S. Dept. Agr. Bur. Ent. Circ. 115, 13 p., illus.

In Virginia Alwood used the following spray mixture against this pest on cattle: 2 gal. petroleum, 1/2 lb. whale-oil soap, 1 gal. soft water; and a small amount of tobacco water. The application was made just after milking, using 1 to 2 pt. for each animal. It killed all the flies that were actually wetted by it and gave protection to the treated animals for 2 days (p. 8).

HUGUIER.

(1214)

1922. TRAITEMENT DE L'HYPODERMOSE CHEZ LE CHEVAL ET LE BOEUF. Vie Agr. et Rur. Paris 20 (17): 291. [Abstract in Rev. Appl. Ent. (B) 10: 138-139. 1922.]

Prophylactic treatments suggested against Hypoderma include the application of tobacco infusion (100 per mille).

MACDOUGALL, R. S.

(1215)

1925. INSECT PESTS OF 1924. Trans. Highland and Agr. Soc. Scotland 1925, 27 pp., illus. [Abstract in Rev. Appl. Ent. (B) 13: 162. 1925.]

Further promising experiments have been made with dressings of nicotine sulphate in combination with lime for the control of warble flies (Hypoderma).

THOMPSON, H. W.

(1216)

1925. A TEST OF THE TOBACCO POWDER AND LIME MIXTURE FOR THE DESTRUCTION OF WARBLEMAGGOTS. Welsh Jour. Agr. 1 (1): 200-201. [Abstract in Rev. Appl. Ent. (B) 13: 184. 1925.]

Six herds of cattle were treated with a dressing of 1 1/2 lb. of fresh lime, 4 lb. of tobacco powder, and 1 gal. of water, for the

destruction of the larvae of warble-flies (Hypoderma). After two dressings about 90 percent of the larvae were killed on animals that were tied up, and another application, made about 3 weeks after the first, was sufficient to kill all of them.

BISHOPP, F. C., LAAKE, E. W., WELLS, R. W., and PETERS, H. S. (1217)

1930. EXPERIMENTS WITH INSECTICIDES AGAINST CATTLE GRUBS, HYPODERMA SPP. Jour. Econ. Ent. 23: 852-863. [Abstract in Rev. Appl. Ent. (B); 19: 34-35. 1931.]

Tobacco powders and dusts containing 2 to 3 percent free nicotine or nicotine sulphate were extensively used and give a high degree of control. Apparently there is little difference between the effectiveness of free nicotine and nicotine sulphate when these are used in hydrated lime, tripoli earth, kaolin, or cream silica. Tests with tobacco powder containing 3.1 percent nicotine and with the same material reground indicate that fineness is an important factor, the reground powder giving a kill of 96.1 percent, as against 61.4 percent with the other. In view of the possible danger to cattle, not more than 3 oz. of 2 percent or 2 oz. of 3 percent nicotine dust should be used on each animal.

MACDOUGAL, R. S. (1218)

1924. OX WARBLE FLIES. Scot. Jour. Agr. 7 (1): 61-72.

Tests on a large scale were conducted to destroy the larvae of Hypoderma bovis and H. lineatum in the skin of infested cattle. One dressing consisted of 1 lb. fresh lime, 1 gal. water, and 4 lb. tobacco powder. It was allowed to stand for 24 hours and was then strained. Applied as a wash with a sponge the liquid killed 82.7 percent of the larvae; applied with a brush, it killed 77.5 percent; and applied with a syringe, it killed as high as 83.3 percent.

A wash, containing lethol (tetrachlorethane) and nicotine, killed as high as 85.2 percent of the warbles, but this mixture was considerably concentrated.

HINDS, W. E. (1219)

1925. DEPARTMENT OF ENTOMOLOGY. La. Agr. Expt. Sta. Ann. Rept. pp. 19-27, illus. [Abstract in Rev. Appl. Ent. (B) 14: 181. 1926.]

Horn fly (Lyperosia irritans L.) on cattle was controlled by a spray consisting of 90 cc. free nicotine, 250 cc. creosote, 1/4 lb. fish-oil soap (in 1 pt. water) and 1 qt. red pine oil diluted to 12 with cold water.

MOORE, WM. (1220)

1917. VOLATILITY OF ORGANIC COMPOUNDS AS AN INDEX OF THE TOXICITY OF THEIR VAPORS TO INSECTS. Jour. Agr. Res. 10: 367-371, illus.

A piece of filter paper was soaked in nicotine and suspended in the center of a flask by means of a fine wire. Various quantities of this alkaloid were tested with an exposure to houseflies (Musca domestica L.) limited to 400 min. in each test. It required 2.4 millionths of a gram molecule to kill the flies in 400 min.

HEADLEE, T. J., and BECKWITH, C. S. (1221)

1918. SPRINKLING SEWAGE FILTER FLY PSYCHODA ALTERNATA SAY. Jour. Econ. Ent. 11: 395-401. [Abstract in Rev. Appl. Ent. (B) 7: 24. 1919.]

The minimum dosage of Black Leaf 40 destructive to the fly was also destructive to the film.

GUIREA, T., and DINULESCU, G. (1222)

1924. RAVAGES CAUSÉS PAR LA MOUCHE DE GOLOUBATZ EN ROUMANIE; SES ATTAQUES CONTRE LES ANIMAUX ET CONTRE L'HOMME. Ann. Trop Med & Parasite 18 (3): 323-342, illus. [Abstract in Rev. Appl. Ent. (B) 12: 190-191. 1924.]

In Rumania, animals are protected against Simulium columbaczense Schonb, by covering the more vulnerable parts with various mixtures such as decoctions from the leaves of absinthe, walnut or hazelnut trees, or even tobacco in vinegar or water.

MCDONALD, R. E. (1223)

1919. THE STABLE FLY. Tex. Agr. Dept. Monthly. News Bull. 2 (3): 3. [Abstract in Rev. Appl. Ent. (B) 7: 168. 1919.]

The following spray is advocated against the stable fly (Stomoxys calcitrans) and horn fly (Lyperosia irritans): 1 to 2 lb. of soap brought to the boil in 1 gal. of water; to this 2 gal. of kerosene are added and when thoroughly mixed a boiled decoction of 1 lb. of tobacco or tobacco stems. For use this spray should be diluted with 9 parts of water.

MITZMAIN, M. B. (1224)

1913. THE SUPRA-CONVEYING FLY OF THE PHILIPPINES AND SOME FACTORS CONCERNING IT AND CONTROL MEASURES. Phil. Agr. Rev. 6 (8): 371-379. [Abstract in Rev. Appl. Ent. (B) 1: 212-214. 1913.]

The U. S. Bureau of Entomology has tried various washes and repellents for Lebanus sticticus F. including kerosene emulsion alone or with tobacco water added.

SEYMOUR-JONES, A. (1225)

1921. WARBLE FLIES AND THEIR MAGGOTS IN CATTLE. Leather Trades' Year Book 1921. London, 13th ed., pp. 169-188, illus. [Abstract in Rev. Appl. Ent. (B) 10: 57. 1922.]

When applied to the backs of cattle, a mixture of tobacco dust and lime has effected the destruction of 96 percent of the maggots of warble flies.

WALTON, C. L.

(1226)

1925. NOTES ON WARBLE FLIES IN NORTH WALES. Welsh Jour. Agr. 1
(1): 195-199. [Abstract in Rev. Appl. Ent. (B) 13: 139-140. 1925.]

The indications are that washing the cattle with various preparations, and the use of tobacco powder, etc., against lice have a decided effect in reducing infestation.

ROE, R. J.

(1227)

1926. THE HORSE BOT-FLY, THE OX WARBLE-FLY, AND THE SHEEP NOSTRIL-FLY. Cyprus Agr. Jour. 21 (2): 52-55. [Abstract in Rev. Appl. Ent. (B) 14: 116. 1926.]

One of the remedies for the ox warble-fly is a dressing composed of 1 1/2 lb. fresh lime, 4 lb. tobacco powder, and 1 gal. water, which should stand for 24 hours and then be strained and applied with a sponge.

ANONYMOUS.

(1228)

1927. REPORT OF THE DEPARTMENTAL COMMITTEE ON WARBLE FLY PEST. Minist. Agr. & Fisheries, London. 48 pp. [Abstract in Rev. Appl. Ent. (B) 15: 8-10. 1927.]

Warbles treated with 4 lb. tobacco powder and 1 lb. lime to 1 imperial gal. water showed over 80 percent mortality. Lethol [tetrachloroethane] with 5 percent liquid nicotine (98-percent) was slightly less effective than Lethol alone. Pure nicotine at 0.5 percent killed about 50 percent of the larvae and nearly 100 percent at 1.28 percent. 1.4 lb. of 40-percent nicotine sulphate in 10 gal. water gave from 75 to 100 percent control when combined with 10 lb. lime, 87 percent control with 10 lbs. sodium carbonate and 84 percent control with 1 1/4 lbs. sodium carbonate. The superiority of tobacco powder and lime over pure nicotine is probably accounted for by the fact that lime produces a slow continuous liberation of nicotine from the powder, whereas the pure nicotine is very volatile. The results of the experiments with nicotine sulphate and lime, however, justify the recommendation of this preparation in addition to the tobacco dust and lime mixture, the formula being 2 fl. oz. 40-percent nicotine sulphate, 1 lb. calcium hydrate, and 1 imperial gal. water. The tobacco dust and lime mixture does not keep well but remains effective for about 6 days if kept in a closed receptacle.

PETER.

(1229)

1927. FURTHER TESTS OF CHEMICAL PREPARATIONS WITH REGARD TO THEIR USEFULNESS IN THE CONTROL OF WARBLE FLY LARVAE. Berl. Tierärztl. Wchnschr. 43: 645-648. [In German.]

Larvae were put in Petri dishes with physiological salt solution and were treated by dropping upon them two to six drops of nicotine (1 percent and 4 percent concentrations) and tobacco-sulphur-lime solutions. The larvae were killed within 2 to 3.5 days.

ALWOOD, W. B.

(1230)

1891. A NOTE ON REMEDIES FOR THE HORN FLY. Insect Life 4: 68-69.

One lb. of tobacco was boiled in 1 gal. water. A mixture, consisting of 1 part kerosene emulsion and 10 parts of this decoction, gave almost perfect immunity for 3 days against horn flies on cattle. One to two pt. of this spray were used per cow.

GRAYBILL, H. W.

(1231)

1914. REPELLENTS FOR PROTECTING ANIMALS FROM THE ATTACKS OF FLIES.

U. S. Dept. Agr. Bull. 131, 26 pp. [Abstract in Rev. Appl. Ent. (B) 3: 37-38. 1915.]

Tobacco powder has less killing power than pyrethrum powder but is more satisfactory as the effect of pyrethrum lasts only for about a day.

COOK, F. C., HUTCHISON, R. H., and SCALES, F. M.

(1232)

1915. FURTHER EXPERIMENTS IN THE DESTRUCTION OF FLY LARVAE IN HORSE MANURE. U. S. Dept. Agr. Bull. 245, 22 pp., illus

"Black Leaf 40" (1 to 50, 1 to 250, and 1 to 500) was applied to manure in cages containing the larvae of houseflies. In none of the tests did it show any larvicidal action (p. 14).

WILHELMI, J.

(1233)

1795. DIE KRIEBELMUCKENPLAGE. Jena, 246 pp., illus. 1920.

To repel Simuliidae (black flies) on animals Schönbaur in 1795 recommended that the animals be rubbed with a decoction of tobacco leaves plus either petroleum or whale oil and that the treatment be renewed every 3 days. He claims to have had good results for 2 years (p. 166).

BISHOPP, F. C., COOK, F. C., PARMAN, D. C., and LAAKE, E. W.

(1234)

1923. PROGRESS REPORT OF INVESTIGATIONS RELATING TO REPELLENTS, ATTRACTANTS AND LARVICIDES FOR THE SCREW-WORM AND OTHERS FLIES.

Jour. Econ. Ent. 16: 222-224. [Abstract in Rev. Appl. Ent. (B) 11: 121-122. 1923.]

The development of fly larvae in blow-fly baits composed of meat products (such as rabbit carcasses) is prevented by surrounding the bait with a solution of 1/3 oz. 40-percent nicotine sulphate in 2 qt. of water

WAHL, R. O., and Du PLESSIS, S.

(1235)

1923. COMEATING SHEEP-MAGGOT FLIES. Jour. Dept. Agr. Union of So. Africa. 7 (5): 428-432, illus. [Abstract in Rev. Appl. Ent. (B) 12: 19-20. 1924.]

A solution of 1 part of nicotine extract (7 percent nicotine) to 60 parts of water should be poured over the bait in fly traps, filling the tin up to the level of the fly entrances. If eggs are deposited in the bait, any maggots that hatch drop to the bottom of the tin and fall into the nicotine solution and are killed.

CREVE, L.

(1236)

1925. VERSUCHE ZUR BEKÄMPFUNG DER DASSEL-FLIEGENPLAGE MITTELS ARZNEIMITTEL. Deut. Tierärztliche Wochenschrift 33: 677-680.

Rubbing hypocotine-paste (a nicotine preparation) on cattle was not very satisfactory as a remedy for botfly larvae. The harmlessness of it to cattle is questioned.

LAAKE, E. W., and CUSHING, E. C.

(1237)

1930. FLY TRAPPING ON THE RANGES OF THE SOUTHWEST. Jour. Econ. Ent. 23: 966-972. [Abstract in Rev. Appl. Ent. (B) 19: 94-95. 1931.]

The most effective bait was found to be 2 lb. fresh meat (of goats or sheep) to which is added 2 gal. water and nicotine sulphate at the rate of 4 cc. to 1 gal. water. The addition of nicotine sulphate inhibits the development of fly larvae and does not interfere with the normal decomposition of the meat or reduce its attractiveness to blow-flies.

PARMAN, D. C.

(1238)

1932. A BOX-TYPE TRAP TO AID IN THE CONTROL OF EYE GNATS AND BLOW-FLIES. U. S. Dept. Agr. Circ. 247, 4 pp., illus. Also, CONSTRUCTION OF THE BOX TYPE TRAP FOR EYE GNATS AND BLOWFLIES. U. S. Dept. Agr. Bur. Ent. Mimeographed Circ. E 299, 4 pp., illus. 1932. [Abstract in Rev. Appl. Ent. (B) 21: 210. 1933.]

The best catches were made when the bait (decaying meat) was floated in water. If parasites are not being reared, it has been found advantageous to add 1 teaspoonful of nicotine sulphate to each gallon of water as a larvicide.

2. Mosquitoes, 1900-1933

HOWARD, L. O.

(1239)

1900. NOTES ON MOSQUITOES OF THE UNITED STATES. U. S. Dept. Agr. Div. Ent. Bull. 25, 70 pp., illus.

Celli and Casagrandi in Italy say that tobacco might be used to kill mosquito larvae, and to kill the aerial mosquitoes we have odors, fumes, or gases. Among the fumes are tobacco, etc. (p. 59).

TRILLAT, and LEGENDRE, J.

(1240)

1909. ÉTUDE SUR LE TOXICITÉ DES VAPEURS DE QUELQUES SUBSTANCES CHIMIQUES SUR LES MOUTTIQUES. Hyg. Gen. et Appl. 4: 542-546.

Tests with the fumes of nicotine and quinoleine under glass bells upon mosquitoes are described. A paper soaked with a 0.5 percent nicotine solution is placed under a glass bell. The mosquitoes are still alive after 30 minutes, but on evaporating 0.1 g. of a dilution of 1/200,000, mosquitoes died in 3 minutes and flies died in 5 minutes.

ECKSTEIN, F.

(1241)

1920. AUS EINER FELDSTATION FÜR STECKMÜCKEN. Ztschr. Angew. Ent. 6: 358-371, illus.

Among the many substances tried in order to determine suitable repellents for mosquitoes was tobacco extract, some of which was rubbed on a spot (about 1 sq. in.) on the upper surface of the hand. The hand was exposed 17 min., during which the treated area received 14 stings and the rest of the hand, 94. There was no protection against Culicada vexans and C. lateralis, but to some extent it warded off C. cantans (pp. 352-353, 370-371).

[PARFENT'EV, I. A.,] PARFENTJEV, T. A.

(1242)

1925. ON THE METHODS OF DESTRUCTION OF MOSQUITOES. Jour. Econ. Ent. 18: 839-840, illus. [Abstract in Rev. Appl. Ent. (B) 14: 28. 1926.]

Smoke from burning waste tobacco plus chopped straw or hay was successful against mosquitoes when applied at a dosage of 30-40 grains per cu. m. and exposed for 16 hours. Nicotine was volatilized by pouring a nicotine solution on unslaked lime. By lengthening the time of exposure to nicotine of Culex pipiens L. and Anopheles maculipennis Mg. from 5 min. to 15 hours the lethal dose of nicotine can be reduced from 8 to 0.5 gr. per cu. m.

SHINGAREVA, N. I.

(1243)

1926. OBSERVATIONS AND CONTROL OF HIBERNATING MOSQUITOES IN SANATORIA. Russ. Jour. Trop. Med., Moscow, No. 4, pp. 23-25. [In Russian. Abstract in Rev. Appl. Ent. (B) 14: 203. 1926.]

The chief control adopted was fumigating, tobacco dust giving the best results at the lowest price. The burning of 40 g. per cu. m. killed all mosquitoes.

VUISHELESSKAYA, N. S., and PARFENT'EV, I. A. (1244)

1926. ON THE METHOD OF CONTROLLING MOSQUITOES. *Defense des Plantes* 3 (1): 97. [In Russian. Abstract in *Rev. Appl. Ent.* (B) 14: 151. 1926.]

In tests with nicotine to destroy mosquitoes in their hibernating quarters, such as cellars, the results show that the lethal dose both for Anophelines and Culicines ranges between 8 g. per cu. m. at an exposure of 5 minutes and 0.5 g. at an exposure of 16 hours.

GLYDE, D. (1245)

1931. REPORT OF THE CONTROL OF MALARIA DURING THE SARDA CANAL CONSTRUCTION (1920-1929). *Rec. Malaria Surv. India* 2 (1): 49-100, illus. [Abstract in *Rev. Appl. Ent.* (B) 19: 163-165. 1931.]

Fumigation of permanent and temporary buildings was carried out at weekly intervals from 1926 and was found to be of great importance. For routine work a mixture of equal parts of sulphur and powdered waste tobacco leaves and stems was employed. Fumigation proved of great value even in the case of laborers' huts and shops made of grass and bamboos. At the rate of 1/2 lb. to 1,000 cu. ft. space, the mixture, if burned quickly, was found to clear closed buildings of mosquitoes in 15 minutes (p. 165).

RICHARDSON, C. H., and SHEPARD, H. H. (1246)

1931. TOXICITY OF NICOTINE TO INSECTS. *Nature* 127 (3195): 144.

The authors describe some experiments (*Jour. Agr. Res.* 41: 337) with mosquito larvae, in which nicotine was presented in aqueous solution only, and in which a wide range in the relative concentration of ions and dissolved molecules was obtained by varying the pH value. Since the results obtained show that the free base is more toxic than its salts in the absence of the gaseous phase, the view that the greater toxicity of the alkaloid is due to its greater volatility, hitherto put forward by other workers who obtained a similar result with methods including this form, cannot be accepted. Nicotine ions are also toxic, but considerably less so than the molecules.

SHEPARD, H. H. (1247)

1931. THE RELATIVE TOXICITY OF ROTENONE AND NICOTINE TO APHIS RUMICIS L. AND MOSQUITO LARVAE. *Jour. Econ. Ent.* 24: 725-731. [Abstract in *Rev. Appl. Ent.* (B) 19: 198. 1931.]

The relative percentages of mortality were 10.5 and 15.5 in the case of 0.01 percent nicotine, and 34.5 and 76.0 in that of 0.01 percent rotenone, for 30-minute and 2-hour exposures respectively. The figures indicate the combined percentage of killed and paralyzed mosquito larvae which had been immersed in suspensions or solutions of the two substances. Against the above aphid the toxicity of rotenone as a contact insecticide is definitely higher than that of nicotine.

WEST, A. P., and RUSSELL, P. F.

(1248)

1932. EXPERIMENTS WITH VARIOUS TOXIC SUBSTANCES PARTIALLY ABSORBED ON CHARCOAL AS AN ANOPHELES LARVICIDE. LARVICIDE STUDIES, IV. Philippine Jour. Sci. 49 (2): 211-217, illus. [Abstract in Rev. Appl. Ent. (B) 21: 9, 1933.]

The larvicidal value of certain non-arsenical substances, including nicotine, partly adsorbed on charcoal (R.A.E., B, 20: 236) was tested against anopheline larvae, but most of them were quite ineffective and none was so satisfactory as paris green.

BOGOJAWLENSKI, N. A.

(1249)

1933. MALARIA IN THE KASAKH DISTRICT OF AZERBAIJAN AS OBSERVED DURING MANY YEARS. Arch. Schiffs- u. Tropenhyg. 37 (1): 19-28, illus. Leipzig. [In German. Abstract in Rev. Appl. Ent. (B) 21: 62. 1933.]

The measures adopted against malaria caused by mosquitoes are quinine prophylaxis, small-scale drainage, dusting with paris green, and fumigation of animal quarters by burning tobacco dust mixed with dung.

CAMPBELL, F. L., SULLIVAN, W. N., and SMITH, C. R.

(1250)

1933. THE RELATIVE TOXICITY OF NICOTINE, ANABASINE, METHYL ANABASINE AND LUPININE OR CULICINE MOSQUITO LARVAE. Jour. Econ. Ent. 26 (2): 500-509, illus. [Abstract in Rev. Appl. Ent. (A) 21: 342. 1933.]

Based on the concentration required to kill 50 percent of the mosquito larvae in 8 hours at 29.3° C., the relative toxicity of the four alkaloids follows: nicotine 100, anabasine 38, methyl anabasine 21, and lupinine 6 (?). According to the unpublished observations of other workers, nicotine and anabasine may be equally effective against aphids. Nicotine and anabasine are much less toxic than rotenone against mosquito larvae and houseflies. .

3. Midgelike Flies, 1879-1934

MILLER, D.

(1251)

1922. THE OLEARIA BUD-GALL MIDGE. Jour. Dept. Agr. New Zeal. 25: 340-344, illus.

This midge (Cecidomyia oleariae Mask.), infests akiraho (Olearia forsteri Hook.), an ornamental shrub in New Zealand. The infestation might be reduced to a certain extent by spraying the shrubs throughout the spring with Black Leaf 40 (1 : 800), but applications have to be made at least 2 or 3 times a week in order to be effective.

TRUELLE, A.

(1252)

1913. IS IT POSSIBLE TO PREVENT THE BLACK CECIDOMYIA FROM LAYING EGGS ON PEAR TREES? Vie Agr. 2: 448-449. [In French. Abstract in Rev. Appl. Ent. (A) 1: 204. 1913.]

Against Cecidomyia pirivora or nigra on pear trees in France the following spray mixture is recommended: 1 l. 10-percent nicotine, 1.5 l. methyl alcohol (90-percent), 200 g. soft soap, and 100 l. rainwater.

MUNDINGER, F. G.

(1253)

1930. APPLE MAGGOT AND PEAR MIDGE INVESTIGATION. New York State Hort. Soc. Proc. 75: 168-171. [Abstract in Rev. Appl. Ent. (A) 18: 453-454, 1930.]

Lime-sulphur 1 to 40, with 3/4 pint nicotine sulphate to 100 gal. appeared the most promising of the materials used against the pear midge (Contarinia pyrivora Riley).

STANILAND, L. H., and WALTON, C. L.

(1254)

1930. EXPERIMENTS ON THE CONTROL OF PEAR MIDGE (CONTARINIA PYRIVORA). PROGRESS REPORT. Agr. Hort. Res. Sta. Bristol Rept. 1929, pp. 124-129. [Abstract in Rev. Appl. Ent. (A) 18: 597. 1930]

Trials were made with a spray of 6 oz. nicotine in 100 gals. water with the requisite amount of soft soap applied to the open blossoms at the rate of 3 1/2 gal. per tree. A marked reduction in attack was observed.

HARTZELL, F. Z.

(1255)

1931. THE PEAR MIDGE. N. Y. State Hort. Soc. Proc. 76th Ann. Meeting, pp. 189-197. [Abstract in Rev. Appl. Ent. (A) 19: 403. 1931.]

Several sprays designed to kill the adult pear midge (Contarinia pyrivora Riley) before they had oviposited, all of which contained nicotine sulphate combined with other materials in the proportion of 1 to 800, were applied in April. The majority gave a high degree of control, particularly one containing 2 percent Volck oil.

MUNDINGER, F. G.

(1256)

1931. THE PEAR MIDGE. Jour. Econ. Ent. 24: 196-200. [Abstract in Rev. Appl. Ent. (A) 19: 352-353. 1931.]

It appears that the pear midge (Contarinia pyrivora Riley) may be best controlled in the adult stage by sprays containing nicotine sulphate applied when the cluster buds begin to swell so that the sepals pull apart. Satisfactory results have been obtained with $3/4$ pt. to 100 gal. in combination with lime-sulphur (1 to 40 or stronger), 2 percent Volck oil emulsion, or 6 lb. fish-oil soap, and with 1 pt. in combination with bordeaux mixture (2-10-100).

ANONYMOUS

(1257)

1932. PLANT DISEASES AND PESTS IN DENMARK IN 1931. Tidsskr. Planteavl. 38, pp. 349-395, illus. Also as Overs. St. Planteopat. Forsøg. No. 48. Copenhagen. [In Danish with a summary in English. Abstract in Rev. Appl. Ent. (A) 20: 655. 1932.]

The attacks of Contarinia pyrivora Riley on pear seemed to be increasing. The trees were sprayed with nicotine without positive result.

SCHØYEN, T. H.

(1258)

1932. SPRAYING EXPERIMENTS WITH CONTARINIA PYRIVORA AND ARGYRESTHIA CONJUGELLA. Landbruksdirekt. Beret. 1931, pp. C1-C14, illus. [In Norwegian. Abstract in Rev. Appl. Ent. (A) 21: 201-202. 1933.]

Spraying the blossom after it was fully opened with nicotine sulphate (1:800) to destroy the newly-hatched larvae of the pear gall-midge (Contarinia pyrivora Riley) before they had time to penetrate the ovaries proved more successful. Trees sprayed with nicotine sulphate when about two-thirds of the blossom was open produced an average of 360 lb. of fruit, trees treated when the petals were about to fall producing 214 lb.

The value of nicotine preparations against the apple fruit miner (Argyresthia conjugella Zell.) was first shown in 1927 in Sweden. Nicotine sprays are most effective if applied on the last day before the eggs of this moth hatch. Laboratory tests showed that 40-percent nicotine sulphate will kill eggs just about to hatch or newly hatched larvae of this moth even at a dilution of 1 to 800. The larvae are killed even if they have partly bored into the skin of the apple. With two sprays applied at the most favorable times the moth can be quite satisfactorily controlled in the orchard by means of a comparatively weak spray. With sprays at double strength (1:400), it is possible to kill 20-day old eggs, so that the use of stronger sprays allows a wider margin of time for making the applications. Details are given of the results of one or two applications of nicotine sulphate in various orchards.

VAYSSIÈRE, P.

(1259)

1928. THE CECIDOMYIID OF THE GRAPE (*CONTARINIA VITICOLA* RÜBS.) IN CHAMPAGNE. Compt. Rend. Acad. Agr. France 14 (27): 906-910. [In French. Abstract in Rev. Appl. Ent. (A) 16: 589. 1928.]

Arsenical treatments are useless, but in the localities invaded by this gall-gnat, the first applications against the vine moths next year should consist of nicotine or pyrethrum.

ESSIG, E. O.

(1260)

1916. THE CHRYSANTHEMUM GALL-FLY, *DIARTHROMYIA HYPOGAEA* (F. LÖW). Jour. Econ. Ent. 9: 461-468, illus.

Black Leaf 40 (1 : 1600) will give temporary relief if applied once or twice, but to get good results it must be used every 2 or 3 weeks.

BRITTON, W. E.

(1261)

1919. EIGHTEENTH REPORT OF THE STATE ENTOMOLOGIST OF CONNECTICUT FOR 1918. Conn. Agr. Expt. Sta. Bull. 211, pp. 249-352. [Abstract in Rev. Appl. Ent. (A) 7: 339-341. 1919.]

Thorough spraying every few days with nicotine sulphate solution (1:500) and soap is said to kill the emerging adults and many of the eggs of the chrysanthemum gall midge (*Diarthronomyia hypogaea* Lw.).

GUYTON, T. L.

(1262)

1919. NICOTINE SULPHATE SOLUTION AS A CONTROL FOR THE CHRYSANTHEMUM GALL MIDGE *DIARTHROMYIA HYPOGAEA* H. LW. Jour. Econ. Ent. 12: 162-165, illus. [Abstract in Rev. Appl. Ent. (A) 7: 279. 1919.]

Nicotine sulphate (40-percent) at 1 to 500 plus 1 oz fish oil soap per gallon was effective provided the plant was completely covered with the solution and the spray repeated every 4 or 5 days.

WEIGEL, C. A., and SANFORD, H. L.

(1263)

1920. CHRYSANTHEMUM MIDGE. U. S. Dept. Agr. Bull. 833, 25 p., illus. [Abstract in Rev. Appl. Ent. (A) 8: 364-365. 1920.]

If nicotine papers are used for fumigation one sheet to 1,000 cu. ft. of space will suffice. If fumigation is impracticable, spraying with 40-percent nicotine sulphate (1 : 800) should be practiced every afternoon for a period of 4 to 6 weeks. If the stocks of chrysanthemums are in benches or cold frames, a thorough treatment with equal parts of dry or air-slaked lime and tobacco dust should be made to help control this midge (*Diarthronomyia hypogaea* Lw.).

ZAPPE, M. P.

(1264)

1920. EXPERIMENTS TO CONTROL THE CHRYSANTHEMUM GALL MIDGE, DIARTHROMYIA HYPOGAEA LOEW. Conn. Agr. Expt. Sta. Bull. 218, pp. 161-165. [Abstract in Rev. Appl. Ent. (A) 8: 342. 1920.]

Nicotine sulphate (40-percent) with soap, applied every 3 or 4 days, is a satisfactory remedy and is probably the easiest and best spray for commercial florists to use.

GRIMES, D. W.

(1265)

1922. THE CHRYSANTHEMUM GALL MIDGE. Miss. State Plant Bd. Quart. Bull. 2 (1-2): 8-9. [Abstract in Rev. Appl. Ent. (A) 11: 109. 1923.]

For combating Diarthromyia hypogaea Lw. chrysanthemum plants should be dipped in or sprayed with a solution of 1 oz. soap, 1 gal. water and a teaspoonful of Black Leaf 40. The treatment should be applied, every 4 or 5 days for about two months or until no more galls are found.

SPEYER, E. R.

(1266)

1928. ENTOMOLOGICAL REPORT. Nursery and Market Gard. Indus. Devlpmt. Soc., 13th Ann. Rept. Expt. and Res. Sta., 1927, pp. 60-80. [Abstract in Rev. Appl. Ent. (A) 17: 405-407. 1929.]

The following recommendations are made for the control of the chrysanthemum midge (Diarthromyia hypogaea Lw.): The plants should be sprayed with nicotine (90 percent commercial), 1 to 400, with potash soft soap (1/2 oz. to a gal.), to kill the adults as they emerge from the galls, and also the eggs. The spray is not effective against the larvae that have entered the leaf tissue. All cuttings should be dipped in nicotine (1 : 800) without soft soap before planting.

MILES, H. W.

(1267)

1929. THE CHRYSANTHEMUM MIDGE, DIARTHROMYIA HYPOGAEA F. LW. Northwest. Nat. 4 (4): 173-175, illus. [Abstract in Rev. Appl. Ent. (A) 18: 330-331. 1930.]

Spraying with 98-percent nicotine at the rate of 2 oz. in 25 gal. water with soft soap to lather while the adults are emerging and ovipositing gave successful control. [cf. R.A.E., A, 17: 406]

GILMORE, J. W., and MILAM, J.

(1268)

1934. A NEW PEST IN TOBACCO PLANT BEDS, LIMNOBIA ULTIMA O. S. Jour. Econ. Ent. 27: 290-291.

Tests were made with nicotine sulphate, 10 cc. per gal. of water. The beds were drenched with this solution and effective control of the infestation was obtained. Kills of the larvae of this tipulid fly were noted within a few minutes after the soil had been treated.

CORY, E. N.

(1269)

1914. ENTOMOLOGICAL FEATURES OF THE YEAR 1913 AND SOME WORK UNDERTAKEN FOR THE CONTROL OF INJURIOUS INSECTS. Md. State Hort. Soc. Rept. 16 (1913): 168-170. [Abstract in Rev. Appl. Ent. (A) 2: 361. 1914.]

Spraying with whale-oil soap and Black Leaf 40 against the boxwood leaf miner Monarthropalpus buxi has not been entirely successful, but promises well.

HAMILTON, C. C.

(1270)

1921. NOTES ON THE LIFE HISTORY AND CONTROL METHODS OF THE BOX WOOD LEAF MIDGE MONARTHROPALPUS BUXI LABOU. Jour. Econ. Ent. 14: 359-365, illus. [Abstract in Rev. Appl. Ent. (A) 10: 72. 1922.]

Of the various contact sprays tried under laboratory conditions one containing 1 part molasses, 5 parts water and Black Leaf 1 to 100 gave the best results. Black Leaf 40 and Black Leaf resinate at 1 to 500 also proved effective. The addition of soap at the rate of 4 lbs. to 50 gals. increased the wetting properties of the spray.

BRITTON, W. E., and ZAPPE, M. P.

(1271)

1922. MISCELLANEOUS INSECT NOTES. Conn. Agr. Expt. Sta. Bull. 234, pp. 94-202. [Abstract in Rev. Appl. Ent. (A) 10: 337-338. 1922.]

For the control of the boxwood leaf miner (Monarthropalpus buxi Lab.), spraying with Black Leaf 40 and Black Leaf resinate alternately, each diluted with 500 parts of water, is recommended.

Spraying orchard trees with lead arsenate with nicotine sulphate added will probably reduce the injury from Contodisca splendoriferella Clem. Sprays that have proved effective against the rhododendron lace-bug Leptobyrssa rhododendri Horv. include nicotine sulphate and kerosene emulsion.

(1272)

1924. TWENTY-THIRD REPORT OF THE STATE ENTOMOLOGIST OF CONNECTICUT, 1923. Conn. Agr. Expt. Sta. Bull. 256, pp. 223-316. [Abstract in Rev. Appl. Ent. (A) 12: 419-422. 1924.]

Spraying with nicotine solution and soap is advised against Lepidosaphes ulmi. Against Monarthropalpus buxi Lab. (boxwood leaf miner) the foliage should be sprayed thoroughly about May 1 with miscible oil (1 to 20 parts water) with 1 pt. 40-percent nicotine sulphate to each 50 gal. of mixture. This treatment should be repeated about a week later.

DODGE, B. O., and SWIFT, M. E.

(1273)

1930. NOTES ON BOXWOOD TROUBLES. Jour. N. Y. Bot. Gard. 31 (368):
191-198. [Abstract in Biol. Abs. 8 (5): 1251. 1934. Entry 11,553.]

The boxwood leaf miner (Monarthropalpus buxi) and boxwood
psylla (Psyllia buxi) may be controlled by spraying with Black Leaf
40, 1 part, molasses (1:5) 500 parts.

ROSS, W. A.

(1274)

1919. THE ROSE MIDGE IN ONTARIO, CANADA. Agr. Gaz. 6 (2): 137-138,
illus. [Abstract in Rev. Appl. Ent. (A) 7: 211-212. 1919.]

Total eradication of the rose midge (Neocerata rhodophaga)
was obtained by sprinkling tobacco dust over the beds in greenhouses
and by nightly fumigating with tobacco paper.

SASSCER, E. R., and BORDEN, A. D.

(1275)

1919. THE ROSE MIDGE. U. S. Dept. Agr. Bull. 778, 8 pp., illus.
[Abstract in Rev. Appl. Ent. (A) 7: 321-322. 1919.]

Tests have shown that Neocerata rhodophaga Coq. may be kept
in check by applications of tobacco dust to the soil and persistent,
nightly fumigation with tobacco.

ROSS, W. A., and CAESAR, L.

(1276)

1922. INSECTS OF THE SEASON IN ONTARIO. Ontario. Ent. Soc. 52d
Ann. Rept. 1921, pp. 42-50, illus. [Abstract in Rev. Appl. Ent.
(A) 11: 192-193. 1923.]

Pests in greenhouses were: Neocerata (Dasyneura) rhodophaga
(rose midge), controlled by tobacco dust; Diarthronomyia hypogaea
(chrysanthemum midge), eradicated by spraying with nicotine and soap
every other day over a period of 6 weeks. Lygus communis, the green
apple bug, was successfully controlled by early applications of nico-
tine sulphate (1:800).

BODENHEIMER, F.

(1277)

1879. CONTRIBUTIONS TO THE KNOWLEDGE OF TIPULA OLERACEA L. Ztschr.
Angew. Ent. 9: 1-80, illus. [In German.]

Girard in 1879 recommended the following mixture against the
larvae of this cranefly in moist meadows: 30 g. tobacco, 60 g.
black soap, and 120 g. flowers of sulphur. These were boiled in
3 l. of water, then diluted with 7 to 8 l. of water, and applied
to the soil containing the larvae. This remedy is now rejected
(pp. 39-40).

THOMPSON, R. W.

(1278)

1930. AN OUTBREAK OF MYCETOPHILID AND CHIRONOMID LARVAE IN A LARGE COMMERCIAL GREENHOUSE. Ontario Ent. Soc. 60th Ann. Rept. 1929, pp. 96-99, illus. [Abstract in Rev. Appl. Ent. (A) 19: 36-37. 1931.]

Tobacco dust applied as a covering about 3/8 in. deep all over the soil immediately after thorough wetting will kill the newly emerging flies and prevent those that have emerged from ovipositing. As it prevents cultivation and watering, this insecticide can be applied only as a temporary measure.

4. Mushroom Flies, 1912-1933

POPEHOE, C. H.

(1279)

1912. INSECTS INJURIOUS TO MUSHROOMS. U. S. Dept. Agr. Bur. Ent. Circ. 155, 10 pp., illus.

One of the best methods for the destruction of adults of mushroom flies (Sciara multiseta Felt and S. agraria Felt) in mushroom houses is fumigation with tobacco or nicotine fumigants such as are used in greenhouses. These should be used in accordance with the directions indicated on the package, because as yet no standard dose has been formulated.

(1280)

1917. MUSHROOM PESTS AND HOW TO CONTROL THEM. U. S. Dept. Agr. Farmers' Bull. 789, 15 pp., illus. [Abstract in Rev. Appl. Ent. (A) 5: 423-424. 1917.]

Pests of cultivated mushrooms include the larvae, commonly known as "mushroom maggots" of Sciara multiseta Felt., S. agraria Felt. and Aphiochaeta albidihalteris Felt. For destroying the adults the houses can be fumigated with tobacco or nicotine preparations such as are used in greenhouses, the treatment being made once a week during the bearing season.

AUSTIN, M. D., and JARY, S. G.

(1281)

1933. INVESTIGATIONS ON THE INSECT AND ALLIED PESTS OF CULTIVATED MUSHROOMS. I. SCIARA FENESTRALIS ZETT. Jour. So. East. Col. Tye, no. 32, pp. 59-62, illus. [Abstract in Rev. Appl. Ent. (A) 21: 489. 1933.]

In regard to mycetophilid flies (Sciara fenestralis) where fumigation is possible, the volatilization of nicotine sometimes gives good results and does not appear to harm the mushroom crop. Adults and young larvae, either hatching or just in the soil, may be killed by the application of 10 oz. or more of nicotine (95 - 98 percent) in 100 gal. water applied by means of a fine rose on a watering can.

MACLEOD, G. F., and BUTCHER, F. G.

(1282)

1934. STUDIES OF MILLIPEDE AND GNAT INJURIES TO POTATO TUBERS. Jour. Econ. Ent. 27: 106-108.

Tobacco dust was used at the rate of from 400 to 500 lbs. per acre. It was applied to the soil by hand or with a grain drill and then worked into the soil by harrowing previous to the planting of the potatoes. Its treatment showed small reductions in the percentage of injured tubers and only a small increase in the percentage of clean tubers. The insect was a fungus gnat larva (Sciara sp.).

CHARLES, V. K., and POPENOE, C. H.

(1283)

1928. SOME MUSHROOM DISEASES AND THEIR CARRIERS. U. S. Dept. Agr. Circ. 27, 9 pp., illus. [Abstract in Rev. Appl. Ent. (A) 16: 570-571. 1928.]

For fumigating mushroom houses, free nicotine is preferable to nicotine sulphate solutions, since the latter are less volatile and the soap generally used to release the free nicotine from them is injurious to mushrooms, though air-slaked lime or hydrated lime at the rate of 1 lb. to 50 gal. nicotine sulphate may be substituted.

STAPEL, C.

(1284)

1932. INSECT PESTS OF MUSHROOM BEDS. Gart. Tidende, reprint 6 p., illus., Copenhagen. [In Danish. Abstract in Rev. Appl. Ent. (A) 20: 369-370. 1932.]

The remedies suggested include a 0.2 percent nicotine spray against the mycetophilid flies, the ceilings and walls as well as the beds being treated if there is a mass infestation; and fumigation with paradichlorobenzene against the springtails.

THOMAS, C. A.

(1285)

1932. OBSERVATIONS ON MUSHROOM INSECTS. Jour. Econ. Ent. 25 (2): 322-331. [Abstract in Biol. Abs. 7 (7): 1630. Entry 16,537. 1933.]

Heavy infestations of flies (Mycetophilidae and Phoridae) may be controlled by pyrethrum dusts and tobacco or cyanide fumigants.

5. Beet Fly, 1917-1933.

F. J.

(1286)

1917. THE BEET FLY. Gard. Chron. no. 1593, p. 4, July. [Abstract in Rev. Appl. Ent. (A) 5: 402-403. 1917.]

Squeezing the leaves to kill the larvae is efficacious against Pegomya hyoscyami (Anthomyia betae), but dusting the plants while damp with soot or powdered lime or spraying the leaves with a strongly smelling tobacco water or with XLALL liquid insecticide also gives good results.

KEMMER, N. A.

(1287)

1925. THE BEET-FLY, PEGOMYIA HYOSCYAMI PZ. AND THE GREAT BEET-FLY
OUTBREAK OF 1924. Meddel. Centralanst. Försöksv. Jordbruksområdet
[Sweden]. No. 288 (Ent. Avdel. no. 47), 56 pp., illus. [In Swedish.
Abstract in Rev. Appl. Ent. (A) 13: 538-539. 1925.]

Experimentally, spraying with 1 - 2 per mille of nicotine
sulphate after thinning out the plants gave good results against the
larvae.

BREMER, H.

(1288)

1926. ON THE BEET FLY PEST AND ITS CONTROL. Illus. Landw. Ztg. 46
(14): 1-3. April 2. [In German. Abstract in Rev. Appl. Ent. (A)
15: 110. 1927.]

Kemmer's experimental results with a nicotine sulphate spray
against the larvae of the beet fly (Pegomyia hyoscyami Panz.) are
not applicable in practice owing to the cost.

JANISCH, R.

(1289)

1926. COMPARATIVE RESEARCHES ON THE ACTION OF RESPIRATORY POISONS
ON THE BEET FLY. Anz. Schädlingsk. 2 (8): 94-96. [In German.
Abstract in Rev. Appl. Ent. (A) 14: 503. 1926.]

In laboratory tests with fumigants on adults of the beet fly
(Pegomyia hyoscyami Panz.) hydrocyanic acid proved to be the cheapest
and most effective, nicotine coming next.

WALTON, C. L.

(1290)

1928. SOME EXPERIMENTS FOR THE CONTROL OF MANGOLD FLY. Welsh Jour.
Agr. 4: 347-350. [Abstract in Rev. Appl. Ent. (A) 17: 438. 1929.]

Sprays of oil emulsion or nicotine sulphate (2 1/2 oz. nicotine
sulphate and 1 lb. soft soap to 10 gal. water) did not injure seedling
plants and afforded considerable protection against the mangel fly
(Pegomyia hyoscyami var. betae Curt.), but they should be applied as
soon as the plants appear.

KAUFMANN, O.

(1291)

1929. STATUS OF THE BEET-FLY IN 1928. Zuckerrübenbau 11: 103.
[Abstract in Fortschr. Landw. 4 (17): 573. 1929. Rev. Appl. Ent.
(A) 17: 686. 1929.]

None of the materials used, including nicotine, against the
larvae of the beet fly (Pegomyia hyoscyami Panz.) in the leaves
proved satisfactory.

FULMEK, L.

(1292)

1931. THE BEET-FLY IN THE TULLNERFELD DISTRICT, AUSTRIA. Wien.
Landw. Ztg. 81 (27), reprint 4 pp. [Vienna.] [In German. Abstract
in Rev. Appl. Ent. (A) 20: 663. 1932.]

The measures advised against this fly (Pegomyia hyoscyami Panz.) were spraying with 2 percent tobacco extract with the addition of 1/8 percent lysol or 1/2 percent soft soap. A further addition of 2 percent methylated spirit can be made.

MENOZZI, C.

(1293)

1931. INFORMATION ON THE DAMAGE CAUSED BY INSECTS TO BEET DURING THE SUGAR-BEET SEASON OF 1930 AND ON THEIR CONTROL. Indus. Saccarif. Ital. 24 (2): reprint 7 pp. 1931. [In Italian. Abstract in Rev. Appl. Ent. (A) 19: 461-462. 1931.]

The only satisfactory measure was spraying with 0.25 percent nicotine sulphate when the larvae of flies (Pegomyia hyoscyami Panz.) first appeared, and it is thought that two applications at an interval of 10 days should be sufficient.

(1294)

1931. ON THE DAMAGE CAUSED BY INSECTS TO SUGAR-BEET IN ITALY DURING THE YEAR 1931. Indus. Saccarif. Ital. 24 (12): reprint 7 pp., illus. [In Italian. Abstract in Rev. Appl. Ent. (A) 20: 252. 1932.]

The beet fly (Pegomyia hyoscyami Panz.) again caused considerable loss in north Italy. It was associated with P. esuriens Mg. and the ephydrid Clanoneurum menozzii Seguy. Spraying with nicotine sulphate proved effective against these flies.

MAYNÉ, R.

(1295)

1932. REPORT ON TESTS OF DESTRUCTION OF THE BEET FLY. Ann. Genbloux 38 (4): 164-168. [Brussels.] [In French. Abstract in Rev. Appl. Ent. (A) 20: 340. 1932.]

In a field test in Belgium with beet seedlings having 4 to 5 leaves, the application of nicotine (1 : 500), with soap killed only about 50 percent of the larvae, the spray not penetrating sufficiently into the mines.

MENOZZI, C.

(1296)

1933. THE SUGAR-BEET SEASON OF 1932 AS REGARDS INSECT INFESTATION. Indus. Saccarif. Ital. 26 (1), reprint 7 pp., illus. [In Italian. Abstract in Rev. Appl. Ent. (A) 21: 267. 1933.]

The beet fly (Pegomyia hyoscyami Panz.) was responsible for a fair amount of injury throughout Italy, but the nicotine sulphate spray again proved effective.

6. Root Maggots, 1857-1929.

TROITZKY, N. N.

(1297)

1921. ABOUT CABBAGE, CHORTOPHILA BRASSICAE AND PLASMODIOPHORA BRASSICAE
Proc. 2d All-Russian Ent.-Phytopath. Meeting in Petrograd, 25th -
30th Oct. 1920, pp. 165-177, illus. [In Russian. Abstract in Rev.
Appl. Ent. (A) 10: 433. 1922.]

Among several insecticides tried against Chortophila was tobacco extract. The plants with the surrounding earth were dipped into the insecticide until the earth was saturated, after which they were transferred to the field. Tobacco apparently retards the growth of the plants. The harvest from the disinfected plants, however, was greatly increased in comparison with untreated plants.

BRITAIN, W. H.

(1298)

1922. FURTHER EXPERIMENTS IN THE CONTROL OF THE CABBAGE MAGGOT
(CHORTOPHILA BRASSICAE BOUCHÉ) IN 1921. Acadian Ent. Soc. Proc.
1921, No. 7, pp. 49-71. [Abstract in Rev. Appl. Ent. (A) 11: 85-86.
1923.]

Plants treated with a dust mixture composed of 1 part mercury bichloride and 99 parts tobacco dust produced the largest yield.

BRITAIN, W. H.

(1299)

1923. SOME RECENT EXPERIMENTS IN THE CONTROL OF THE CABBAGE MAGGOT
(CHORTOPHILA BRASSICAE BOUCHÉ). Jour. Econ. Ent. 16: 61-68.

A tobacco dust (99 percent) corrosive sublimate mixture gave the highest average results of the four mixtures tested for a three year period.

VASINA, A. N.

(1300)

1927. THE CABBAGE FLY (HYLEMYIA BRASSICAE BOH. AND H. FLORALIS FALL.)
Trud. Oputno-Issled. Uchastka Stantz. Zashch. Rast. Vred. Moskovsk.
Zemel. Otd., pt. 1, pp. 62-89, illus. Moscow. [In Russian.
Abstract in Rev. Appl. Ent. (A) 16: 412-414. 1928.]

Tobacco dust applied to the soil under cabbage plants did not prevent oviposition, but the crop from the plot thus treated was much greater than from an untreated plot.

HAYES, W. P.

(1301)

1927. OBSERVATIONS ON INSECTS ATTACKING SORGHUMS. Jour. Econ. Ent.
15: 349-356. [Abstract in Rev. Appl. Ent. (A) 11: 6-7. 1923.]

The seed corn maggot - Hylemyia cillicornu Rd. (Phorbia fusciceps Zett.) was found seriously damaging planted kafircorn seed in Kansas. One test of repellents with tobacco compounds, using nicotine resinate, tobacco oil, and nicotine sulphate (40-percent) on commercial white corn indicates that they may be of some value. The nicotine sulphate which had a strong odor at the end of the test had not injured germination and repelled the larvae.

SMITH, J. B.

(1302)

1907. REPORT OF THE ENTOMOLOGICAL DEPARTMENT. N. J. Agr. Expt. Sta. Rept. for 1906, pp. 515-609, illus.

As a remedy against the maggots of the onion fly (Pegomya cepetorum), dust the soil freely with tobacco powder before planting the onions and afterwards every time it rains. The results obtained were variable, but fairly effective (pp. 551-558).

TUCKER, E. S.

(1303)

1917. RELATION OF THE COMMON ROOT MAGGOT (PEGOMYIA FUSCICEPS ZETT.) TO CERTAIN CROPS IN LOUISIANA. Jour. Econ. Ent. 10: 397-406.
[Abstract in Rev. Appl. Ent. (A) 5: 492-493. 1917.]

In the case of tomato plants, tobacco powder scattered on the beds was a promising method of control, and this material is said to act as a fertilizer as well as being a repellent.

SLINGERLAND, M. V.

(1304)

1857. THE CABBAGE ROOT MAGGOT WITH NOTES ON THE ONION MAGGOT AND ALLIED INSECTS. N. Y. (Cornell) Agr. Expt. Sta. Bull. 78, pp. 481-577, illus. 1894.

Tobacco is classified as an ineffective or impracticable method. It is to be applied on or about the plants, and according to a brief review of the literature on the cabbage root maggot (Phorbia brassicae Bouché), tobacco was used in 1857, 1877, and 1885. The author's own experiments did not convince him of its effectiveness (pp. 550-552).

ROSTRUP, S.

(1305)

1918. INVESTIGATIONS IN THE LIFE-HISTORY AND THE METHODS OF CONTROLLING THE CABBAGE FLY, PHORBIA BRASSICAE, IN DENMARK. 128 Beret. Statens Fødselsgsvirksomhed i Plantekultur, København, pp. 255-313, illus. [In Danish. Abstract in Rev. Appl. Ent. (A) 7: 98. 1919.]

Tobacco dust and nicotine spray were not reliable against cabbage flies.

BRITAIN, W. H.

(1306)

1920. ONE YEAR'S EXPERIMENTS IN THE CONTROL OF THE CABBAGE MAGGOT. Ontario Ent. Soc. Ann. Rept. 50 (1919): 61-68. [Abstract in Rev. Appl. Ent. (A) 9: 127. 1921.]

Nicotine sulphate with clay, and nicotine with sulphur gave some measure of success against the cabbage maggot Phorbia brassicae but did not seem worthy of further trial. The use of a mixture of 40 percent tobacco dust, 1 percent corrosive sublimate and 59 percent clay produced the largest number of uninfested plants.

O'KANE, W. C., CLEVELAND, C. R., and HADLEY, C. H.

(1307)

1923. SURFACE TREATMENTS FOR THE CABBAGE MAGGOT. N. H. Agr. Expt. Sta. Tech. Bull. 24, 42 pp. [Abstract in Rev. Appl. Ent. (A): 12: 241-242. 1924.]

A mixture of tobacco dust and calcium carbonate, equal parts by weight, gives good results against Phorbia (Chortophila) brassicae Bch. when applied to early planted cabbage. A little of the mixture should be placed close around the stem of the plant. The protection afforded to radishes and turnips by this treatment is even more marked.

BRITAIN, W. H.

(1308)

1924. REPORT OF THE PROFESSOR OF ENTOMOLOGY AND ZOOLOGY AND PROVINCIAL ENTOMOLOGIST. Ann. Rept. Sec. Agr. Nova Scotia 1923, pp. 48-61. [Abstract in Rev. Appl. Ent. (A) 12: 205. 1924.]

A mixture of 99 percent tobacco with 1 percent mercury bichloride was equal to a solution of mercury bichloride 1 - 1280 in controlling Phorbia (Chortophila) brassicae.

GLASGOW, H., and GLOYER, W. O.

(1309)

1924. THE MERCURIC CHLORIDE TREATMENT FOR CABBAGE MAGGOT CONTROL IN ITS RELATION TO THE DEVELOPMENT OF SEED-BED DISEASES. Jour. Econ. Ent. 17: 95-101. [Abstract in Rev. Appl. Ent. (A) 12: 174. 1924.]

The mercury bichloride solution as used in the control of Phorbia (Chortophila) brassicae Bch. (cabbage maggot) holds common diseases of the cabbage seed bed in check. The other two methods in common use for maggot control, the cheesecloth screen and applications of tobacco dust, appear to favor the development of such fungous troubles, especially during wet seasons.

BRITAIN, W. H.

(1310)

1927. THE CABBAGE MAGGOT. Bull. Dept. Nat. Resources Nova Scotia, no. 11, 53 pp., illus. [Abstract in Rev. Appl. Ent. (A) 16: 279-280. 1928.]

A mixture of 99 parts tobacco dust and 1 part mercury bichloride was one of the best treatments tried over a period of 4 years for the control of the cabbage maggot (Phorbia (Hylemyia) brassicarum Bch.).

GERASIMOV, B. A. (1311)

1927. SPRING CONTROL OF THE CABBAGE FLY (HYLEMYIA BRASSICAE BCH.)

Sad i. Ogorod no. 3, 8 pp. [In Russian. Abstract in Rev. Appl. Ent. (A) 16: 416. 1928.]

The percentage of infestation of Phorbia (Hylemyia) brassicarum Bch. may be considerably reduced by applying tobacco dust to the soil near the stems of the plants. Applications should be made 2 or 3 times at intervals of 7 - 8 days and renewed after rain.

FLINE, W. P., and COMPTON, C. C. (1312)

1925. A NEW METHOD FOR CONTROLLING THE ONION MAGGOT. Jour. Econ. Ent. 18: 111-116.

Nicotine dust (2 percent) and sulphur nicotine dust were dusted on onions infested with a fly (Phorbia ceparum). They were partially effective, but not as efficient as a solution of corrosive sublimate and a bordeaux-oil emulsion.

BÜTTNER, J. (1313)

1907. GEGEN DIE MADEN AN DEN KOHLWURZELN. Prakt. Ratgeber Obst. u. Gartenbau 22: 122-123.

Tobacco dust was put around the stems of cabbage and cauliflower to prevent the flies from ovipositing on the plants. It helped some, but was applied too late.

SMITH, K. N., and WADSWORTH, J. T. (1314)

1921. THE CARROT AND ONION FLIES. SOME PRELIMINARY ATTEMPTS AT THEIR CONTROL. Fruit-Grower, Fruiterer, Florist and Market Gard. [London.] 51 (1322): 575-578; (1323): 615-618, illus. [Abstract in Rev. Appl. (A) 10: 49-50. 1922.]

No insecticide gave a very high degree of immunity; 68 percent immunity was obtained by the use of nicotine, 1 oz. in 5 gal. water, applied with a watering can.

GLASGOW, H. (1315)

1926. THE CABBAGE MAGGOT - ITS CONTROL. N. Y. State Hort. Soc. Proc. 71, pp. 16-18.

Treatment with tobacco dust is one of three methods recommended. The use of tobacco dust in small plantings should appeal to the grower on account of its safety and the ease with which it may be applied. To insure control in the seed-bed tobacco dust should be applied at the rate of about 1 lb. to 30 or 40 ft. of row.

JARY, S. G.

(1316)

1929. EXPERIMENTS ON THE CONTROL OF THE CARROT, ONION, AND CABBAGE ROOT FLIES. Gard. [London] 85 (2205): 250-251. [Abstract in Biol. Abs. 6 (11): 2594, 2595, Entry 25,276. 1932.]

Nicotine sulphate with precipitated chalk at 1 to 100 applied 3 times against the carrot fly killed only 59.3 percent, while the same mixture at 1 to 12 killed only 43.6 percent of the onion fly treated.

7. Other Flies, 1912-1934

LUNDBLAD, O., and LINDBLOM, A.

(1317)

1925. THE CELEBY FLY, ACIDIA (PHILOPHYLL) HERACLEI L. AS A PEST IN SWEDEN. Meddel. Centralanst. Försöksv. Jordbruksområdet [Sweden]. (Ent. Avdel. No. 45) 25 pp., illus. [In Swedish. Abstract in Rev. Appl. Ent. (A) 13: 537. 1925.]

Spraying with a 1 - 2 per mille solution of nicotine sulphate showed good results as the majority of both the larvae and pupae were killed by it.

KORFF, G., and BÖNING, K.

(1318)

1934. CELEBY FLIES AND THEIR CONTROL. Prakt. Bl. Pflanzenbau u. Schutz. 11 (11): 261-265, illus. [In German. Abstract in Rev. Appl. Ent. (A) 22: 229. 1934.]

It is reported in Bavaria that the ovipositing females of Acidia heraclei L. and Psila rosae F. can be repelled by strewing between the plants certain insecticides, including tobacco dust.

WEISS, H. B.

(1319)

1918. UNUSUAL NURSERY INSECTS. N. J. Dept. Agr. Bur. Statist. and Insp. Circ. 24, 13 pp., illus. [Abstract in Rev. Appl. Ent. (A) 7: 215-216. 1919.]

In regard to the iris leaf miner flies (Agromyza laterella Zett.), the remedial measures consist in destroying the larvae in their mines by spraying with an 8 percent kerosene emulsion, or with Black Leaf 40 (1 pt. to 100 gal. water), with 5 lb. soap added. The sumac psyllid (Calophya nigripennis Riley) is not seriously injurious, but should control be necessary, the application of tobacco extract and soap is suggested.

HUTSON, J. C.

(1320)

1932. REPORT ON THE WORK OF THE ENTOMOLOGICAL DIVISION. Ceylon Admin. Rept. Dir. Agr. 1931, pp. D111 - D121. [Abstract in Rev. Appl. Ent. (A) 20: 723-724. 1932.]

Preliminary tests against the various stages of Agromyza phaseoli Coq. on beans showed that a tobacco spray applied daily for 10 days after germination reduces the severity of the attack to such an extent that the plants were able to produce good crops.

FINK, D. W.

(1321)

1913. THE ASPARAGUS MINER AND THE TWELVE-SPOTTED ASPARAGUS BEETLE. N. Y. (Cornell) Agr. Expt. Sta. Bull. 331, pp. 411-435, illus.

In tests to control the dipterous larvae of the above miner (Agromyza simplex Lowe), Black Leaf 40 (1 : 500 and 1 : 700) plus 4 lb. soap was used. The weaker spray had no effect on the larvae, but young larvae just beginning their mines were found killed by the stronger solution (p. 419).

HERRICK, G. W.

(1322)

1913. THE ASPARAGUS MINER AND THE TWELVE-SPOTTED ASPARAGUS BEETLE. N. Y. (Cornell) Agr. Expt. Sta. Bull. 331, pp. 411-435, illus. [Abstract in Rev. Appl. Ent. (A) 1: 295-296. 1913.]

Spraying with tobacco extract (Black Leaf 40) in the proportion of 1 to 500 with an addition of 4 lb. of soap is the best remedy against the larvae of the asparagus miner.

DRAKE, C. J., and HARRIS, H. M.

(1323)

1932. ASPARAGUS INSECTS IN IOWA. Iowa Agr. Expt. Sta. Circ. 134, 12 pp., illus. [Abstract in Rev. Appl. Ent. (A) 20: 464-465. 1932.]

For large areas, thorough spraying with 4/5 pt. of 40-percent nicotine sulphate in 50 gal. water containing 2 to 3 lb. dissolved soap is recommended against a fly (Agromyza simplex) which infects asparagus.

BÖNING, K.

(1324)

1931. EXPERIMENTS IN COMBATING THE LARVAE OF BIBIO HORTULANUS L. Prakt. Bl. Pflanzenbau u. Schutz 9 (7-8): 145-160. [In German. Abstract in Rev. Appl. Ent. (A) 20: 79. 1932.]

This insect occurred in abundance in barley fields in Bavaria and severely infested gherkins grown under glass. A contact insecticide containing 1 percent tobacco extract and 1 percent soft soap watered on the soil gave good results, and would probably be completely successful at twice that strength.

HORNÍK, A., and NOLČ, S.

(1325)

1931. EXPERIMENTS IN THE CONTROL OF THE LARVAE OF *BIBIO MARCI* L. AND NOTES ON ITS BIOLOGY. Ochr. Rost. 11 (3-4): 115-120, illus. [Prague]. [In Czechoslovakian. Abstract in Rev. Appl. Ent. (A) 20: 204. 1932.]

This insect does severe damage to cereals in Czechoslovakia. Of the insecticides tested, 1 and 2 percent sprays of tobacco extract containing 7 percent nicotine sulphate, applied at the rate of about 55 gallons to the acre, killed 42 and 52 percent of the larvae respectively, as compared with a death rate of 6 percent in untreated soil.

MOORE, J. B.

(1326)

1916. THE CATTLEYA FLY. N. J. Agr. Expt. Sta. Bull. 308, 12 pp., illus. [Abstract in Rev. Appl. Ent. (A) 6: 326-327. 1918.]

Pyrethrum and nicofume were tried as fumigants but were not strong enough to kill or prevent oviposition by this insect (*Isosoma orchidearum* Westw.). One sheet of nicofume in 600 cubic feet of space did not prevent oviposition, and it is doubtful whether the plants would stand a stronger dose on 180 consecutive nights. Nicotine solution when put into the cavity with the insects is satisfactory, but will not permeate the plant tissues.

MIETHE, E.

(1327)

1927. DIE CATTLEYA-FLIEGE UND IHRE BEKÄMPFUNG. Gartenwelt 31: 624-626, illus.

Fumigation with nicotine will kill, no doubt, the flies. (*Eurytoma* (*Isosoma*) *orchidearum* Westw.) that have emerged, but the larvae inside their burrows in the orchids are fairly well protected from the fumes. It will therefore be necessary to repeat the fumigations every two weeks during the summer, till all evidence of infestation has vanished (p. 625).

SANDERS, J. G.

(1328)

1912. A REMEDY FOR CHRYSANTHEMUM LEAF-MINER. Jour. Econ. Ent. 5: 472. [Abstract in Rev. Appl. Ent. (A) 1: 55. 1913.]

Forty percent nicotine sulphate at 1 to 400 killed the eggs, larvae and newly formed pupae of the above leaf miner. The pupae of all ages were killed with a 1 to 200 nicotine solution. The nicotine affected the larvae through the leaf epidermis by osmosis. Several types of lepidopterous and coleopterous leaf miners were killed by the use of nicotine sprays on a small scale, but field tests were not conducted.

MACDOUGALL, R. S.

(1329)

1913. INSECT PESTS IN SCOTLAND IN 1912. Highland and Agr. Soc. Scot. Trans. Reprint 17 pp., illus. [Abstract in Rev. Appl. Ent. (A) 1: 387-388. 1913.]

Nicotine at 1 to 400 kills larvae and newly formed pupae of the chrysanthemum leaf miner and at 1 to 200 kills pupae of all ages. The American Black Leaf 40, a concentrated solution of nicotine sulphate, is very effective.

SANDERS, J. G., and FRACKER, S. B.

(1330)

1916. DIVISION OF ENTOMOLOGY. Wis. Dept. Agr. Bien. Rept. for the years 1915-1916, Bull. 10, pp. 30-56. [Abstract in Rev. Appl. Ent. (A) 6: 555-556. 1918.]

Forty percent nicotine sulphate (1 : 400), with or without whale-oil soap, was a satisfactory control for the chrysanthemum leaf miner (Phytomyza chrysanthemi Kowartz).

WEISS, H. B.

(1331)

1916. NOTES ON SOME MISCELLANEOUS ECONOMIC INSECTS FOUND IN NEW JERSEY. Canad. Ent. 48 (4): 141-143. [Abstract in Rev. Appl. Ent. (A) 4: 259. 1916.]

Nicotine spray is a satisfactory remedy for the chrysanthemum fly Phytomyza chrysanthemi Kowarz. Fumigation with nicotine extracts to kill the adults of the chalcid Isosoma orchidearum Westw. is the most efficient method of control.

RUHMANN, M. H.

(1332)

1926. REPORT OF THE ASSISTANT ENTOMOLOGIST, VERNON. Brit. Columbia Dept. Agr., 20th Ann. Rept. (1925), pp. 36-36. [Abstract in Rev. Appl. Ent. (A) 15: 69-70. 1927.]

The chrysanthemum leaf miner (Phytomyza chrysanthemi Kow.) under glass was controlled with nicotine solutions.

VASSILIEV, E. M.

(1333)

1914. THE PRINCIPAL INJURIES TO AND DISEASES OF CHRYSANTHEMUMS. Hort. and Market-Gard. [Kiev] nos. 6-7. Reprint, 8 pp. [In Russian. Abstract in Rev. Appl. Ent. (A) 2: 424-425. 1914.]

Burning of the leaves attacked, spraying with nicotine in water (1 : 10,000) and the watering of the compost every 14 days with a 5-percent tobacco extract are recommended against flies (Phytomyza geniculata Macq.) whose larvae form mines. Against Adelphocoris lineolatus Goeze (fam. Miridae), Chifflet recommends spraying with 1-percent tobacco extract, accompanied by a dusting of the shoots and buds with sulphur.

DINGLER, M.

(1334)

1933. CHEMICAL CONTROL OF THE ASPARAGUS FLY. Anz. Schädlingssk. 9
(1): 1-9, illus. [In German. Abstract in Rev. Appl. Ent. (A) 21:
139. 1933.]

In laboratory tests with contact dusts against adults of the asparagus fly (Platyparea poeciloptera Schr.) in Germany (R.A.E., A, 19: 513), a proprietary one containing nicotine was the most rapid in action. Field tests with this dust are described, and under certain conditions the plants most open to attack were protected.

PARROTT, P. J.

(1335)

1914. SUSCEPTIBILITY OF POLEMLIA RUDIS TO NICOTINE. Jour. Econ. Ent. 7 (6): 487.

A nicotine preparation (90 percent nicotine and 10 percent water) was applied by means of a wad of cotton to the sills at the base of window panes. The nicotine on the sills caused a large mortality of the above cluster flies when the insects alighted upon the moist places. Black Leaf 40 was also effective, but less rapid.

WEISMANN, R.

(1336)

1934. INVESTIGATIONS ON THE LIFE-HISTORY AND CONTROL OF THE CHERRY FLY, RHAGOLETIS CERASI L. Landw. Jahrb. Schweiz 48 (3): 281-338, illus. [In German. Abstract in Rev. Appl. Ent. (A) 22: 433. 1934.]

The most effective bait spray consisted of 1 percent of a proprietary nicotine preparation and 3 percent raw sugar.

BOYCE, A. M.

(1337)

1931. EFFECTIVENESS OF CERTAIN MATERIALS IN PRODUCING MORTALITY OF THE WALNUT HUSK FLY, RHAGOLETIS COMPLETA CRESS. Calif. Dept. Agr. Monthly Bull. 20 (10-11): 682-690, illus. [Abstract in Rev. Appl. Ent. (A) 20: 175-176. 1932.]

The results of tests with a spray of 40 percent nicotine sulphate (of which a stock solution of 75 cc. to 100 g. sugar and 300 cc. water was applied at the rate of 5 cc. in 95 cc. water) show that its action is very rapid as compared with other materials. The spray was allowed to dry on the nuts before the flies were placed in the cages. Previous tests indicated that the incorporation of sugar in the mixture prevents the quick volatilization of the nicotine.

(1338)

1932. MORTALITY OF RHAGOLETIS COMPLETA CRESS. (DIPTERA; TRYPETIDAE) THROUGH INGESTION OF CERTAIN SOLID MATERIALS. Jour. Econ. Ent. 25 (5): 1053-1059. [Abstract in Rev. Appl. Ent. (A) 20: 692-693. 1932.]

Studies in which various substances, including ground tobacco leaves, were employed, demonstrated that the flies actually take the undissolved particles into the stomach. The nicotine compounds and mixtures tested were relatively slow in their action as stomach poisons.

GLASGOW, H., and GAMBRELL, F. L.

(1339)

1926. THE CHERRY FRUIT FLY. N. Y. State Agr. Expt. Sta. Circ. 87, 10 pp., illus. [Abstract in Rev. Appl. Ent. (A) 14: 580. 1926.]

Under the name cherry fruit fly the authors include two species - Rhagoletis fausta O.S. (dark-bodied fruit fly) and R. cingulata Lw. (white-banded fruit fly). Properly timed arsenical sprays are the most satisfactory measures though should the first application have been deferred its action may be hastened by the addition of 1 or 1 1/2 pt. nicotine sulphate to 100 gal. of the spray or 2 percent nicotine dust to the standard 90 - 10 sulphur and lead arsenate dust.

O'KANE, W. C.

(1340)

1914. THE APPLE MAGGOT. N. H. Agr. Expt. Sta. Bull. 171, 120 pp., illus. [Abstract in Rev. Appl. Ent. (A) 3: 57-59. 1915.]

Experiments with applications to the soil of kerosene emulsion, Black Leaf 40, Clift's Insecticide, commercial lime-sulphur, and Phintas oil failed to produce satisfactory results against the apple maggot or railroad worm (Rhagoletis pomonella).

L. HYMENOPTERA, 1898-1934

1. Apple-Sawfly, 1929-1934

PETHERBRIDGE, F. R., and TUNNINGTON, F.

(1341)

1929. THE CONTROL OF APPLE SAWFLY. Jour. Min. Agr. 35 (11): 1055-1059. [Abstract in Rev. Appl. Ent. (A) 17: 255. 1929.]

The article records experiments with a spray consisting of 4 oz. nicotine (95-98 percent), 4 lb. soft soap and 40 imperial gal. water against Hoplocampa testudinea Klug. (apple sawfly). Spraying should be begun as soon as the petals fall, and the second spraying should follow 7 to 10 days later. Where the water is hard more soft soap may be needed, or where it is too hard to use soft soap some other spreader such as Agral I (R.A.E.A. 16: 585) or casein-soda should be substituted.

If nicotine is added to a fungicide the results are often disappointing as the amount of spray applied as a fungicide is so very much less than that applied as a contact spray.

AUSTIN, M. D., JARY, S. G., and MARTIN, H.

(1342)

1932. SOME NEW INSECTICIDES AND POSSIBLE INSECTICIDE-FUNGICIDE COMBINATIONS. Hort. Ed. Assoc. Yearbook 1: 85-92. Wye, Kent, So. East. Agr. Col. [Abstract in Rev. Appl. Ent. (A) 21: 90. 1933.]

In laboratory tests against the hop-damson aphid (Phorodon humuli Schr.), anabasine had an insecticidal action equal to or better than that of nicotine at the same weight concentration. Two proprietary nicotine preparations were found to be sufficiently effective to warrant field trials. Tests against Hoplocampa testudinea Klug. on apple in the field were made with 8 oz. nicotine in 100 gal. bordeaux (4:6:100) containing 6 pt. cottonseed oil in comparison with nicotine-soap. In all cases they effected a marked reduction in the number of attacked fruitlets.

KEARNS, H. G. H., and SWARERICK, T.

(1343)

1932. SOME OBSERVATIONS ON THE CONTROL OF THE APPLE SAWFLY HOPLOCAMPA TESTUDINEA (KLUG). Bristol Agr. Hort. Res. Sta. Rept. 1931, pp. 112-117. [Abstract in Rev. Appl. Ent. (A) 20: 550-551. 1932.]

Preliminary tests showed that satisfactory control of the larvae before they enter the fruit can be obtained with a spray of 8 fl. oz. nicotine (98 percent), 2.5 lb. Agral I (which equals 0.25 percent solution), and 100 gal. water.

MILES, H. W.

(1344)

1932. ON THE BIOLOGY OF THE APPLE SAWFLY, HOPLOCAMPA TESTUDINEA KLUG. Ann. Appl. Biol. 19 (3): 420-431, illus. [Abstract in Rev. Appl. Ent. (A) 20: 579-580. 1932.]

The results obtained by other workers (R.A.E. A. 12: 505; 17: 255) in attempts to control this insect by sprays of lead arsenate or soap and nicotine are discussed.

KEARNS, H. G. H., MARSH, R. W., and PEARCE, T. J. P.

(1345)

1933. EXPERIMENTS WITH COMBINED INSECTICIDE-FUNGICIDE SPRAYS FOR APPLES. PROGRESS REPORT. Bristol Agr. Hort. Res. Sta. Ann. Rept. 1932, pp. 66-85. [Abstract in Rev. Appl. Ent. (A) 21: 556-557. 1933.]

A mixed wash containing 1.5 gal. emulsified oil, 1.5 gal. lime-sulphur, 3 oz. nicotine, 2 lb. calcium arsenate, and 3 lb. lime in 100 gal. caused some defoliation, which was serious on 3 varieties. A preliminary trial was carried out with a spray, designed to combine the post-blossom scab spray with the nicotine application against the sawfly (Hoplocampa testudinea Klug.), containing 1.5 gal. lime-sulphur and 8 oz. nicotine in 100 gal. water, with either 2.5 lb. Agral I or 1 lb. of a proprietary wetting agent, both of which are more effective than soap and are compatible with lime-sulphur. No spray damage occurred. The percentage of apples infested by the sawfly were 80 on unsprayed trees and 46 and 35 on the sprayed ones.

KEARNS, H. G. H., and SWARBRICK, T.

(1346)

1933. FURTHER OBSERVATIONS ON THE CONTROL OF THE APPLE SAWFLY, HOPLOCAMPA TESTUDINEA (KLUG). Bristol Agr. Hort. Res. Sta. Ann. Rept. 1932, pp. 90-94. [Abstract in Rev. Appl. Ent. (A) 21: 557. 1933.]

Nicotine washes similar to those used the previous year reduced the infestation to 10.6 percent, even when applied as late as 12 days after petal fall. The greater effectiveness of the nicotine wash and derris-oil emulsion was due to the fact that they were toxic to larvae in surface burrows as well as to exposed or (in the case of lead arsenate) to feeding larvae.

MILES, H. W.

(1347)

1933. DUSTING FOR THE CONTROL OF APPLE SAWFLY: A PRELIMINARY EXPERIMENT. Jour. Min. Agr. 39 (12): 1125-1128, illus. [Abstract in Rev. Appl. Ent. (A) 21: 212-213. 1933.]

Good control has been obtained with nicotine sprays accurately timed by the flowering of the apples to kill the newly hatched larvae (R.A.E., A, 17: 255; 20: 550), but in plantations of mixed varieties, in which the female sawflies (Hoplocampa testudinea Klug.) have been found to be present for about 2 weeks, the flowering period varies.

MOORE, M. H.

(1348)

1933. SOME INCIDENTAL EFFECTS OF ROUTINE SCAB-SPRAYS WITH SPECIAL REFERENCE TO APPLE FRUIT SAWFLY-CONTROL - A SIDELIGHT ON THE INTERPRETATION OF FIELD SPRAYING EXPERIMENTS. East Malling Res. Sta. Rept. 1932, pp. 90-98. [Abstract in Rev. Appl. Ent. (A) 22: 52-53. 1934.]

A spray of 8 oz. nicotine and 8 lb. soft soap to 100 gal. applied before blossoming against capsids probably accounted for the scarcity of the sawfly Hoplocampa testudinea Klug. on all trees despite a heavy crop.

KEARNS, H. G. H.

(1349)

1934. CONTROL OF APPLE SAWFLY. Fruit Grower, 1933. 4 pp. [London]. CONTROL OF THE APPLE SAWFLY (HOPLOCAMPA TESTUDINEA). Herfordshire Co. Agr. Quart. Jour., 6 pp. [Abstract in Rev. Appl. Ent. (A) 22: 425-426. 1934.]

Three double and one single spray method are recommended, the basis of the formula (cf R.A.E., A. 21: 557) being 8 oz. nicotine (98-percent), 1/2 lb. Lethalate wetting preparation or 2.5 lb. Agral I or equivalent wetter, and 100 gal. water.

STEER, W.

(1350)

1934. NICOTINE SPRAY FOR THE APPLE SAWFLY. Nature 133 (3360): 463.
March 24.

It was found that the egg of this sawfly (Hoplocampa testudinea Klug.) can be killed by means of a spray containing 0.05 percent nicotine and 0.5 percent commercial soft soap.

2. Other Sawflies, 1898-1934

BOGDANOV-KAT'KOV, N. N.

(1351)

1932. REVISION OF HYMENOPTERA INJURIOUS TO CULINARY PLANTS. Bull. Leningrad Inst. Control. Fm. For. Pests, No. 3, pp. 149-195, illus. [In Russian. Abstract in Rev. Appl. Ent. (A) 21: 120-121. 1933.]

Nicotine dusts and sprays may be used against the larvae of sawflies (Ametastegia equiseti Fall.) on edible sorrel.

WEBSTER, R. L.

(1352)

1912. THE PEAR-SLUG (CALIROA CERASI LINN.). Iowa Agr. Expt. Sta. Bull. 130, pp. 166-192, illus.

Black Leaf 40 (1 : 1,000) killed 92.2 percent of the young slugs, but later it killed only 32 percent of the nearly mature sawfly slugs (p. 173).

WILSON, H. F.

(1353)

1913. INSECT PESTS IN OREGON. Ore. Agr. Expt. Sta. Dept. Ent. Rept. Bien. Crop Pest and Hort. Rept., pp. 81-121. [Abstract in Rev. Appl. Ent. (A) 1: 130-131. 1913.]

Of four remedies tried against the cherry and pear slug (Caliroa cerasi L.), white hellebore gave by far the most satisfactory results. Black Leaf 40 gave practically the same results and did not injure the foliage, but it is more expensive than the hellebore.

CROSBY, C. R., and LEONARD, M. D.

(1354)

1922. INSECTS THAT HUNT THE ROSE. Amer. Rose Ann., Amer. Rose Soc. pp. 89-100, illus. [Abstract in Rev. Appl. Ent. (A) 10: 316-317. 1922.]

The sawflies Endelomyia rosae Harr. (American rose slug), Cladium pectinicornis Fourc. (bristly rose slug) and Emphytus cinctus L. (coiled rose slug) are controlled by the application of 2 lb. lead arsenate in 50 gal. water of bordeaux mixture, hellebore spray or dust, and Black Leaf 40.

OBARSKI, J.

(1355)

1931. A PEST OF ROSES AND STRAWBERRIES, CLADIUS PECTINICORNIS GEOFFR. (TENTHREDINIDAE, HYMENOPTERA). Choroly Róslin [Warsaw] 1 (3-4): 10 pp., illus. [In Polish with a summary in German. Abstract in Rev. Appl. Ent. (A) 20: 344. 1932.]

Young larvae may be controlled with a spray of 30 percent nicotine sulphate (1 to 200), and older ones with a spray of 1 to 1.25 lb. paris green and 2 to 2.5 lb. lime to 150 gal. water.

FLUITER, H. J. DE

(1356)

1934. ON THE TIME WHEN THE PINE SAWFLY (DIPRION PINI L.) SHOULD BE COMBATTED. Nederland. Boschbouwk. Tijdschr. 7 (3): 70-81, illus. [In Dutch. Abstract in Rev. Appl. Ent. (A) 22: 338-339. 1934.]

The larvae are gregarious, and during the first fortnight they feed very little. Nicotine, or preferably an arsenical, should be applied at this period.

ROMANOVSKY-ROMANKO, V.

(1357)

1914. THE IMPORTANCE OF TOBACCO DUST IN FRUIT-GROWING AND MARKET-GARDENING. Agr. Gaz. 36 (48): 1162-1163. [In Russian. Abstract in Rev. Appl. Ent. (A) 3: 20. 1915.]

Attention is called to the enormous quantities of tobacco dust obtained yearly in the tobacco industry. Tobacco dust was used successfully against Eriocampa adumbrata on young cherry trees.

MIDDLETON, W.

(1358)

1922. SAWFLIES INJURIOUS TO ROSE FOLIAGE. U. S. Dept. Agr. Farmers' Bull. 1252, 14 pp., illus. [Abstract in Rev. Appl. Ent. (A) 10: 405. 1922.]

Nicotine sulphate (40-percent) at 1 to 800 with the addition of some fish oil or laundry soap is effective against the larvae of the tenthredinids, Cladius isomerus Norton (bristly rose slug), Eriocampoides (Caliroa) aethiops F. (European rose slug), and Emphytus cinctipes Norton (coiled rose worm), and also against aphids.

GARDNER, A. K.

(1359)

1913. REPORT OF THE STATE HORTICULTURIST. Maine Commr. Agr. 12th Ann. Rept. 1913, pp. 46-102. [Abstract in Rev. Appl. Ent. (A) 2: 709-710. 1914.]

In controlling the pear slug (Eriocampoides cerasi) hellebore and Black Leaf 40 have proved the most efficient. The best spray mixture at present in use against the green apple aphid is Black Leaf 40, combined with sufficient soap to render it adhesive. Cloudy days, when the humidity is high, and late afternoons are the best times for application, as rapid evaporation has a tendency to reduce the effectiveness of any contact spray. When properly applied tobacco-stem decoction and even Ivory soap have produced good results.

SEVERIN, H. C.

(1360)

1918. THE PEAR, CHERRY OR PLUM SLUG. S. Dak. State Ent. Circ. 27, 6 pp., illus. [Abstract in Rev. Appl. Ent. (A) 11: 54. 1923.]

The larvae of sawfly (Eriocampoides limacina Retz.) may be destroyed by spraying with 1 pt. of 40 percent nicotine sulphate, 1 1/2 lb. of soap and 50 gal. of water.

FULMEK, L.

(1361)

1920. DIE KIRSCHBLATTWESPE (CALIROA CERASI L.) Mitt. Pflanzenschutzstation. 4 pp., illus. [Abstract in Rev. Appl. Ent. (A) 8: 261-262. 1920.]

A spray that proved effective against Eriocampoides limacina L. (Caliroa cerasi L.) consists of 10 lb. tobacco extract, 1/2 gal. petroleum, 1/4 gal. demilysol, and 100 gal. water.

DELLA BEFFA, G.

(1362)

1921. THE PEAR SLUG, ERIOCAMPOIDES LIMACINA. R. Osserv. Fitopat. [Turin] Foglio d'Istruzione 14, 3 pp., illus. [In Italian. Abstract in Rev. Appl. Ent. (A) 9: 473. 1921.]

If serious loss is threatened by Eriocampoides (Tenthredo) limacina, dusting with quicklime, sulphur, or tobacco should be employed. A lead arsenate or nicotine spray may also be used.

FRIEND, R. B.

(1363)

1931. THE LIFE HISTORY AND CONTROL OF THE BIRCH LEAF-MINING SAWFLY (FENUSA PUMILA KLUG.) Jour. Econ. Ent. 24: 171-177. [Abstract in Rev. Appl. Ent. (A) 19: 349-350. 1931.]

It is difficult to kill the larvae within the leaves, but applications of nicotine sulphate either with or without soap in concentrations as low as 1 to 1,500 in water have killed between 90 and 100 percent of the eggs. The nicotine sulphate contained 40 percent nicotine and the soap contained 9.25 percent moisture and 62.89 percent soap, much of the remainder being sodium silicate.

FRIEND, R. B.

(1364)

1933. THE BIRCH LEAF-MINING SAWFLY, FENUSA PUMILA KLUG. Conn. Agr. Expt. Sta. Bull. 348, pp. 291-364, illus. [Abstract in Rev. Appl. Ent. (A) 21: 416-417. 1933.]

The eggs may be killed by nicotine sulphate and water (1:1,000) applied to both surfaces of the leaves twice at weekly intervals beginning about May 25 against the first generation and three times at similar intervals beginning about July 3 against the second (R.A.E., A., 19: 349).

NOUGARET, R. L., DAVIDSON, W. M., and NEWCOMER, E. J.

(1365)

1916. THE PEAR LEAF-WORM. U. S. Dept. Agr. Bull. 438, 23 pp., illus. [Abstract in Rev. Appl. Ent. (A) 5: 122-123. 1917.]

The best control against this insect, the pear sawfly (Gymnonychnus californicus Marl.) is a poison spray of 4 lb. lead arsenate to 100 gal. of water and a contact spray of fish oil soap 4 lb., water 100 gal., and nicotine sulphate (40-percent) 1:1,200 applied when the larvae are about half grown.

ANONYMOUS

(1366)

1915. THE PRINCIPAL QUERIES RECEIVED AT THE CENTRAL PHYTOPATHOLOGICAL STATION DURING 1914. Diseases of Plants 9 (1-2): 44-66. [In Russian. Abstract in Rev. Appl. Ent. (A) 4: 23-24. 1916.]

For pear trees infested with Hoplocampa brevis Klug spraying the buds with a solution of 2 lb. of soft soap, 1/2 lb. crude carbolic acid, and 6 lb. tobacco extract in from 40 to 45 gal. water is recommended. For fig trees attacked by Phopalosiphum dianthi Schr. spraying with a solution of 1 lb. tobacco extract in 3 - 4 1/2 gal. water is recommended.

FOSTER, S. W.

(1367)

1913. THE CHERRY FRUIT SAWFLY. U. S. Dept. Agr. Bur. Ent. Bull. 116, pt. 3, pp. 73-79. [Abstract in Rev. Appl. Ent. (A) 1: 178. 1913.]

In the Rogue River Valley, Oregon, spraying with lead arsenate proved satisfactory in controlling Hoplocampa cookei Clarke. A spray of nicotine sulphate 1 to 2,000 with 3 percent distillate oil emulsion applied in the early morning was also effective.

ESSIG, E. O.

(1368)

1914. THE CHERRY FRUIT SAWFLY. Calif. State Comm. Hort. Monthly Bull. 3 (1): 31-35, illus. [Abstract in Rev. Appl. Ent. (A) 2: 244. 1914.]

A 3 percent distillate-oil emulsion to which has been added nicotine sulphate at the rate of 1 to 2,000 has also been suggested for the control of Hoplocampa cookei (cherry fruit sawfly.).

DURUZ, W. P.

(1369)

1922. THE CHERRY FRUIT SAWFLY AND ITS CONTROL. Calif. Dept. Agr. Monthly Bull. 11 (4): 393-399, illus. [Abstract in Rev. Appl. Ent. (A) 10: 356. 1922.]

Of the various sprays tested against Hoplocampa cookei Clarke, nicotine sulphate in combination with either lime-sulphur or a miscible oil proved the most effective.

PETHERBRIDGE, F. R., THOMAS, I., and HEY, G. L.

(1370)

1933. ON THE BIOLOGY OF THE PLUM SAWFLY HOPLOCAMPA FLAVA L., WITH NOTES ON CONTROL EXPERIMENTS. Ann. Appl. Biol. 20 (3): 429-438, illus. [Abstract in Rev. Appl. Ent. (A) 21: 560-561. 1933.]

A spray of 4 lb. soft soap and 4 oz. nicotine in 10 gal. water was applied to plum trees. Some of the sprayed trees showed 2.4 percent damaged fruit and others, 1.8 percent, as against 11.3 percent on the unsprayed trees.

SPRENGEL, L.

(1371)

1928. THE LIFE-HISTORY OF THE PLUM SAWFLY AND EXPERIMENTS IN ITS CONTROL. Obst- u. Gemüsebau, reprint, 2 pp., illus. [In German. Abstract in Rev. Appl. Ent. (A) 17: 333-334. 1929.]

A second spray of either an arsenical or nicotine gave satisfactory results against the larvae of this sawfly (Hoplocampa fulvicornis Panz.).

BIRD, R. D.

(1372)

1926. THE LIFE HISTORY OF THE SASKATOON SAWFLY (HOPLOCAMPA HALCYON NORTON). Sci. Agr. 6 (10): 353-357. [Abstract in Rev. Appl. Ent. (A) 14: 389. 1926.]

The fruit of saskatoon, Amelanchier spicata, is severely injured by the larvae of the sawfly Hoplocampa halcyon Nort. Adults could probably be killed by a contact spray of nicotine and oil emulsion in early morning.

SPRENGEL, L.

(1373)

1930. THE PLUM SAWFLIES (HOPLOCAMPA MINUTA CHRIST AND H. FLAVA L.) Ztschr. Angew. Ent. 16 (1): 1-86, illus. [In German. Abstract in Rev. Appl. Ent. (A) 18: 436. 1930.]

The best control measure appears to be spraying the young fruits with arsenicals. The effect of the spray is increased by the addition of nicotine.

FEYTAUD, J.

(1374)

1924. LES HAPLOCAMPES OU VERS CORDONNIERS DANS LE SUD-OUEST DE LA FRANCE. Rev. Zool. Agr. et Appl. 23 (2): 29-44, illus. [Abstract in Rev. Appl. Ent. (A) 12: 375. 1924.]

Nicotine repels sawflies and oviposition is interrupted. For this purpose a spray of copper or lime-sulphur with nicotine or even a simple nicotine solution (0.15 percent) with soft soap (1.5 percent) should be applied at the beginning of blossoming and repeated 10 or 12 days later.

SWAINE, J. M.

(1375)

1917. SOME FEATURES OF INTEREST IN CONNECTION WITH OUR STUDIES OF FOREST AND SHADE TREE INSECTS. Ontario Ent. Soc. 47th Ann. Rept. for 1916, pp. 95-106, illus. [Abstract in Rev. Appl. Ent. (A) 5: 550-551. 1917.]

As regards the imported alder leaf miner or sawfly Kaliosysphinga dohrni, a good spray is Black Leaf 40, 1 part to 100 gal. water, with 5 lb. soap; this killed all the larvae in the foliage sprayed.

HERRICK, G. W.

(1376)

1912. NOTES ON THREE SHADE TREE PESTS. Jour. Econ. Ent. 5: 169-172.

Black Leaf 40 (1 to 800 of soap solution) apparently killed within a short time every larva sprayed of the elm sawfly leaf miner (Kaliosysphinga ulmi).

DANIEL, D. M.

(1377)

1928. BIOLOGY AND CONTROL OF THE BLACKBERRY LEAF-MINER. N. Y. Agr. Expt. Sta. Tech. Bull. 132, 38 pp., illus. [Abstract in Rev. Appl. Ent. (A) 16: 460-461. 1928.]

Nicotine sulphate (1:400) killed only 18 percent of the larvae of Metallus rubi Forbes in the mines and was ineffective against the eggs and the adults.

MIDDLETON, W.

(1378)

1921. LECONTE'S SAWFLY, AN ENEMY OF YOUNG PINES. Jour. Agr. Res. 20 (10): 741-760, illus. [Abstract in Rev. Appl. Ent. (A) 9: 266-267. 1921.]

For young larvae of Neodiprion lecontei Fitch, less than 3/8 inch long, nicotine sulphate is fairly satisfactory; but lead arsenate, 2 lb. powder in 50 gal. water, is preferable.

FAILLOT, A.

(1379)

1922. SUR UN PARASITE NOUVEAU DES PLANTATIONS DE PÊCHERS DANS LA VALLÉE DU RHÔNE. Prog. Agr. et Vitic. 77 (3): 69-71. [Abstract in Rev. Appl. Ent. (A) 10: 141. 1922.]

Nicotine or quassia are advocated against the sawfly Neurotoma nemoralis attacking peach orchards in the Rhone Valley. The formula used was 1-1/3 gal. nicotine (at 1 lb. to the gal.), 20 lb. soft soap, and 100 gal. water. The first spray should be applied as soon as the first larvae appear.

(1380)

1922. LA FAUSSE CHENILLE DU PÊCHER. Rev. Hort. Algérie 26 (6): 110-112. [Abstract in Rev. Appl. Ent. (A) 10: 537. 1922.]

The only treatment found to be effective against the sawfly, Neurotoma (Lyda) nemoralis was spraying with nicotine or quassia. Nicotine spray is prepared by dissolving 20 lb. black soap in 10 or 12 gal. of boiling water, cooling, and adding 1 1/2 gal. nicotine (10 percent) or 1/5 of that quantity titrated at about 50 percent, and the whole brought to 100 gal. This should be applied when oviposition is noticed, care being taken to wet the lower surface of the leaves.

FAES, H., and STAEBELIN, M.

(1381)

1923. UN DANGEREUX PARASITE DE L'ABRICOTIER EN VALAIS, LA LYDA NEMORALIS. Ann. Agr. Suisse 24 (2): 107-111. [Abstract in Rev. Appl. Ent. (A) 11: 529. 1923.]

The sawfly Neurotoma (Lyda) nemoralis is a serious pest of apricots in Valais. Contact insecticides are less dangerous than arsenicals and should be applied as soon as all the larvae have emerged. Formulae recommended are 2 percent soft soap with the addition of titrated nicotine or concentrated tobacco extract (1 percent or 1 part pyrethrum-soap to 10 of water.

MARCHAL, P.

(1382)

1924. TRAVAUX EFFECTUÉS DANS LES STATIONS D'ENTOMOLOGIE ET DE PATHOLOGIE VÉGÉTALE EN 1923. Ann. Sci. Agron. France et Etrang. 41 (3): 167-194.

Against Lyda nemoralis on peach trees in France a nicotine-bordeaux mixture is recommended. In 1923 Paillot fixed the conditions of application of this mixture and of lead arsenate as the only treatments which deal effectively with it (p. 170).

FAILLLOT, A.

(1383)

1934. MÉTHODES DE LUTTE CONTRE NEUROTOMA MEMORATA. Ann. Épiphyties [Paris] 10 (4): 215-237, illus.

Peach trees were sprayed with a solution, consisting of 150 g. pure nicotine, 2 kg. black soap, and 100 l. water, on May 14, 1921, with the result that the appearance of the trees was much better than those not treated. It was found that the nicotine treatment does not check the development of the embryo in the eggs, but kills it during its last stage, shortly before hatching (op. 217-218).

A single experiment was made in 1921 on a row of peach trees in France by dusting with lime treated with nicotine. The result obtained does not warrant recommending this treatment for the control of Neurotoma on peaches (p. 219).

PEIRSON, H. B.

(1384)

1929. OBSERVATIONS ON THE BIRCH LEAF MINING SAWFLY. Jour. Econ. Ent. 22 (3): 588-594. [Abstract in Rev. Appl. Ent. (A) 17: 553. 1929.]

Nicotine sulphate 1 to 400 plus 1 ounce dissolved laundry soap per gal. of spray killed 98 percent of the birch leaf-mining sawflies (Phyllotoma nemorata Fall. = Phlebotrophia mathesoni (MacG.) on white birch and 100 percent on gray birch, untreated trees showing only 2 percent mortality.

BROWER, A. E.

(1385)

1933. CONTROL OF THE BIRCH LEAF-MINING SAWFLY. Jour. Econ. Ent. 26 (3): 732. [Abstract in Rev. Appl. Ent. (A) 21: 476. 1933.]

Four years of work in the control of Phyllotoma nemorata Fall. has shown that 100 percent mortality can be obtained by the application of nicotine sulphate (1:800) with soap or penetrol. In the field a dilution of 1 to 1,000 killed 99 to 100 percent and one of 1 to 1,500, 98 to 100 percent, but these weaker dilutions have not been tested with power outfits on large birch trees. An application has also given satisfactory control of Eucuculatrix canadensisella Chamb.

PARROTT, P. J., and FULTON, E. B.

(1386)

1915. CHERRY AND HAWTHORN SAWFLY LEAF-MINER. Jour. Agr. Res. 5: 519-528, illus. [Abstract in Rev. Appl. Ent. (A) 4: 98-99. 1916.]

Decorative hawthorns should be protected against Profenusa collaris by spraying with nicotine solution, 1 pt nicotine (40-percent) to 100 gal. water, to which are added 4 lb. soap. The liquid should be applied when the insects first begin to mine the leaves.

ANONYMOUS

(1387)

1917. DE BESSENBELTWERP, PTERONUS RIBESII SCOP. (MEMATUS VENTRICOSUS LATR.) Inst. v. Phytopat., Vlugschr. No. 17, May, 6 pp. [Abstract in Rev. Appl. Ent. (A) 5: 441. 1917.]

Tobacco may be used for dusting bushes for combating the currant and gooseberry sawfly Pteronius ribesii Scop.

STELLWAAG, F.

(1388)

1921. SPRING TREATMENT AGAINST SOME IMPORTANT ANIMAL PESTS OF FRUIT TREES AND BUSHES. Flugschr. Staatl. Lehr- u. Versuchsanst. Wein- u. Obstbau in Neustadt a.d. H., 2 pp. [In German. Abstract in Rev. Appl. Ent. (A) 10: 19. 1922.]

Aphids should be sprayed from below with nicotine. The larvae of the sawfly (Pteronius ribesii) should be sprayed with nicotine and soft soap, Zabulon, or urania green.

BAUMACKE

(1389)

1925. A SERIOUS ENEMY OF GOOSEBERRY AND CURRANT BUSHES. Kranke Pflanze 2 (5): 95-97. [Abstract in Rev. Appl. Ent. (A) 13: 601-602. 1925.]

A suitable spray for the control of the gooseberry sawfly Pteronius (Mematus) ribesii Scop. is a 2-percent solution of tobacco extract, applied after the berries have been picked.

PASSY, P.

(1390)

1898. VER LIMACE DU POIRIER. Rev. Hort. 70: 460-461, illus.

Nicotine, diluted in 15 to 20 times its volume with water, is effective against the very sensitive larvae of Anthredo adumbrata L. on pear trees.

HARUKAWA, C.

(1391)

1925. STUDIES ON THE RUSH SAWFLY, TOMOSTETHUS JUNCIVORUS ROHWER. Ber. Chara Inst. Landw. Forsch. 2 (5): 521-545, illus. [In German. Abstract in Rev. Appl. Ent. (A) 14: 3-4. 1926.]

One of the most successful measures against the larvae was 1 part by weight tobacco dust plus 20 parts wood ash.

3. Ants, 1908-1933

ZETEK, J.

(1332)

1920. THE LEAF-CUTTING ANT IN PANAMA. Rev. LaSalle, Panama, July-August, reprints, 8 pp., illus. [In Spanish. Abstract in Rev. Appl. Ent. (A) 10: 25-26. 1922.]

As control measures against this ant (Atta cephalotes), those advised are the use of repellents, such as nicotine sulphate, or mercury bichloride, the poisoning of the fungus, cultivated in the nests, the collection and destruction of the females, and fumigation of the nests.

REYNE, A.

(1393)

1919. SOME REMARKS ON COMBATING INSECTS INJURIOUS TO LIBERIAN COFFEE. Dept. Landb. in Suriname, [Paramaribo] Bull. 37, 18 pp. [In Dutch. Abstract in Rev. Appl. Ent. (A) 8: 536-537, 1920.]

A spray mixture containing nicotine sulphate was used against ants (Polychoderus bidens), but it was not as effective as were two other mixtures.

BARBER, E. R.

(1394)

1916. THE ARGENTINE ANT; DISTRIBUTION AND CONTROL IN THE UNITED STATES. U. S. Dept. Agr. Bull. 377, 23 pp. [Abstract in Rev. Appl. Ent. (A) 4: 473-474. 1916.]

Nicotine sulphate prolongs the effectiveness of the adhesive in bands used around trees, beehive stands, etc., as a protection against the Argentine ant (Iridomyrmex humilis Mayr).

COOK, M. T., and HORNE, W. T.

(1395)

1908. INSECTS AND DISEASES OF THE ORANGE. Cuba Estac. Cent. Agron. Bull. 9 (English Ed.), 40 pp., illus.

As a remedy against the fire ant (Solenopsis geminata Fab.) on orange trees in Cuba, the following formula has been used: 1 part tobacco tea, 1 part sal soda, and 2 parts resin. This is a good insecticide and, if used several times, will probably be very effective (p. 10).

WOODWORTH, H. E.

(1396)

1920. DAMAGE TO NURSERY PLANTS BY THE FIRE ANT (SOLENOPSIS GEMINATA, SUBSP. MANIOSA WHEELER). Calif. Dept. Agr. Monthly Bull. 9 (3): 87-88, illus. [Abstract in Rev. Appl. Ent. (A) 8: 239-240. 1920.]

Besides fumigation with carbon bisulphide and potassium cyanide, a solution of Black Leaf 40 is also very effective.

MCCOLLOCH, J. H., and HAYES, W. P.

(1397)

1916. A PRELIMINARY REPORT ON THE LIFE ECONOMY OF SOLENOPSIS MOLESTA SAY. Jour. Econ. Ent. 9: 23-38, illus.

Black Leaf 40 was tried in a large number of germination tests and in no case did it injure the germination of the kafir seed corn which was dipped in it. The treated seed seemed to be repellent to the above ant (p. 37).

UPHOF, J. C. T.

(1398)

1910. NIKOTIN-SCHWELFPULVER GEGEN ANEISEN. Köller's Deut. Gärt. Ztg. 25: 280-281.

Against ants in greenhouses or dwellings use tobacco dust mixed with flowers of sulphur. Dust this mixture in the passages and especially in the nests of the ants. This kills them.

ANONYMOUS

(1399)

1916. THE CONTROL OF PESTS OF FORESTS IN THE FORESTRIES OF THE GOVERNMENT OF TAMBOV IN 1915. Forest Life and Econ. 5 (2): 8-12. [In Russian. Abstract in Rev. Appl. Ent. (A) 4: 197. 1916.]

In one forest, ants were controlled by spraying with tobacco extract.

LINDBLOM, A.

(1400)

1933. EXPERIMENTS IN THE CONTROL OF ANTS. Meddel. Statens Växtskyddsanst. no. 1, 16 pp., illus. [In Swedish. Abstract in Rev. Appl. Ent. (A) 21: 498. 1933.]

An account is given of the various measures employed against ants in Sweden. Tests with various deterrents and with solutions of nicotine and of soft soap used as contact poisons were unsuccessful.

4. Bees, 1910-1933

BOURNE, A. I.

(1401)

1927. THE POISONING OF HONEY BEES BY ORCHARD SPRAYS. Mass. Agr. Expt. Sta. Bull. 234, pp. 74-84. [Abstract in Rev. Appl. Ent. (A) 16: 362. 1928.]

Laboratory tests showed that while bees are strongly repelled by a spray containing 1 1/2 lb. lead arsenate to 50 gal. water containing lime-sulphur 1 to 40 and nicotine sulphate 1 to 1,000, this mixture is nevertheless highly toxic to those that feed on it and very rapid in its action. Any mixture containing nicotine sulphate appeared to exercise a strong repellent action which, however, persisted longer in the laboratory than in the field tests.

STÜBINGER, H.

(1402)

1928. ON THE ACTION OF VARIOUS INSECTICIDES ON LOWER ANIMALS. Anz. Schädlingssk. 4 (9-10): 116-119, 130-134. [In German. Abstract in Rev. Appl. Ent. (A) 17: 59-60. 1929.]

Tests on honeybees were made to ascertain the general effect of the chief insecticides. The approximate lethal doses required for 1,000 g. weight of bees, calculated on the amount required for one bee, were: Arsenic, 5 mg., in about 1 1/2 to 3 hours; hydrocyanic acid, 0.15 mg., in about 20 hours; nicotine, 0.3 mg.; sodium fluoride, 0.15 mg., in about 20 hours; lead acetate or lead nitrate, 750 mg. in 1 to 5 days.

GINSBURG, J. M.

(1403)

1929. INSECTICIDE INVESTIGATIONS. N. J. Agr. Expt. Sta. Rept. Dept. Ent. for 1928, pp. 158-163.

In preliminary tests honey, containing tobacco dust, nicotine oleate, benzoyl-nicotine, tin-nicotine, and iron-nicotine, was fed to honeybees. In regard to toxicity, not one of these was equal to arsenious oxide.

(1404)

1931. THE USE OF CERTAIN HIGHLY PENETRATING PINE OIL DERIVATIVES AS ADJUNCTS IN CONTACT INSECTICIDES. N. J. Agr. Expt. Sta. Rept. 1929-1930, pp. 167-169. [Abstract in Rev. Appl. Ent. (A) 20: 83-84. 1932.]

Preliminary tests with honeybees and aphids indicate that when pine oil distillates having a boiling range of from 170 to 270° C., and similar distillates, are mixed in either nicotine or pyrethrum sprays in a concentration of 0.25 percent or higher, the toxicity of the contact insecticide is increased to an extent similar to that obtained with 0.5 percent of soap.

BRITTAIN, W. H.

(1405)

1933. APPLE POLLINATION STUDIES IN THE ANNAPOLIS VALLEY, N. S., CANADA 1928-1932. Canada Dept. Agr. Bull. 162, 198 pp., illus. [Abstract in Rev. Appl. Ent. (A) 22: 35-36. 1934.]

Clear evidence of repulsion of honeybees by copper sulphate, lime-sulphur and nicotine has been obtained experimentally, but under orchard conditions it appears to be temporary and does not prevent serious loss by arsenic spraying. No clear cases of poisoning by nicotine were obtained under field conditions. Less mortality resulted from sprays and dust containing nicotine in addition to the arsenical.

LÜDERWALDT, H.

(1406)

1910. ZUR BIOLOGIE ZWIER BRASILIANISCHER BIEN. W. Ztschr. Wiss. Insektenbiol. 6: 297-298.

The Brazilian bee (Pasiphae iheringi Schrottky) dies quickly when tobacco smoke is blown on it. All of those caught by the author were killed immediately by blowing cigarette smoke into the hollow hand in which he held them (p. 298).

M. COLEOPTERA, 1894-1934

1. Flea Beetles, 1903-1934

DIEULEVEUT

(1407)

1903. DESTRUCTION DE L'ALTISE. Rev. Hort. 75: 275.

Against flea beetles on turnips the following spray mixture was effective: 1/3 l. nicotine, 1 kg. black soap, 1/3 l. kerosene, and 30 l. water.

GRUVEL, A.

(1408)

1905. LA DÉFENSE CONTRE L'ALTISE. Bull. Soc. Étude et Vulg. Zool. Agr. 4 (3): 73-76.

Against flea beetles on grape vines nicotine spray solutions were found effective as an insecticide and as a repellent.

GRANGER, A.

(1409)

1906. LES INSECTES NUISIBLES À L'AGRICULTURE. Bull. Soc. Études et Vulg. Zool. Agr. 5 (6): 164-165.

A 1-percent nicotine solution is recommended against flea beetles (Altica oleracea) on garden vegetables in France.

LAFFORGUE, G.

(1410)

1912. LA LUTTE CONTRE L'ALTISE. Prog. Agr. et Vitic. 58: 686-692.

Against flea beetles on vegetables the following two spray mixtures are recommended in France: 133 g. nicotine solution (4-percent) and 97 l. bordeaux mixture; and (2) 133 g. nicotine (10-percent and 100 l. bordeaux.

GUÉNAUX, G.

(1411)

1913. POUR LUTTER CONTRE L'ALTISE. Vie Agr. et Rurale 2 (11): 309.

The remedy against flea beetles is to spray in the spring, preceded by destroying all rubbish. Work systematically by spraying 15 rows of grape vines and skip the next 5. The beetles will then concentrate on the 5 not treated, where they may be finally destroyed. The bordeaux-nicotine mixture used consists of 2 percent copper sulphate, 1.33 l. titrated nicotine, and 100 l water.

S., W.

(1412)

1914. THE PROTECTION OF TRANSPLANTED CABBAGE FROM FLEA-BEETLES. Rolnik i Hodowca. [Agriculturist and Stockbreeder] No. 21, p. 250. [In Polish? Abstract in Rev. Appl. Ent. (A) 3: 394. 1915.]

Against flea beetles, spraying transplanted crops with the following was recommended: 5 lb. tobacco extract, 2 1/2 lb. slaked lime, 1 1/4 lb. copper sulphate, and 2 1/2 lb. quassia or decoction in 250 gal. water.

FERNALD, H. T., and BOURNE, A. I.

(1413)

1919. DEPARTMENT OF ENTOMOLOGY. Mass. Agr. Expt. Sta. 31st Ann. Rept. Pts. I and II. Publ. Doc. 31, pp. 39a - 43a. [Abstract in Rev. Appl. Ent. (A) 8: 75. 1920.]

Flea beetles on potatoes were well controlled by nicotine sulphate (40-percent) at 1 to 800 in combination with either bordeaux mixture, Pyrox or Insecto.

ROSTRUP, S.

(1414)

1920. FLEA-BEETLE ATTACK IN 1918. THE HABITS AND CONTROL OF FLEA BEETLES. Beret. Statens Forsogsvirke, i Plantekultur 142; Tidsskr. Planteavl. 27: 216-286, illus. [In Danish with a summary in English. Abstract in Rev. Appl. Ent. (A) 8: 541. 1920.]

For garden and experimental plots infested with flea beetles, spraying with tobacco extract diluted to a nicotine percentage of 0.1 (100 - 120 gal. an acre) was advocated.

ANONYMOUS

(1415)

1921. VERSUCHE ZUR BEKÄMPFUNG DER OELFRUCHTSCHÄDLINGE. Mitt. Biol. Reichsanst. Land u. Forstw. No. 22, 49 pp. [Abstract in Rev. Appl. Ent. (A) 10: 263-264. 1922.]

A tobacco spray containing 0.14 percent nicotine proved more poisonous to flea beetles than any other spray tried.

BLUNCK, H.

(1416)

1927. CAN FLEA-BEETLES BE COMBATED SUCCESSFULLY WITH DUST PREPARATIONS? Landw. Wchabl. Schleswig-Holstein No. 19 [Kiel]. [In German. Abstract in Rev. Appl. Ent. (A) 15: 382. 1927.]

Nicotine is effective against these halticid beetles that infest cruciferous plants but is so expensive that its general use is impossible.

ANDREEVA, N. V.

(1417)

1930. THE HEMP FLEA-BEETLE AND ITS ECONOMIC IMPORTANCE. Bull. Sev.-Chernoz. Oblastn. Sel.-Khoz. Opuitn. Stants. (Bull. North Black Soil Zone Reg. Agr. Expt. Sta.), No. 1, pp. 20-23, [Orel]. [In Russian. Abstract in Rev. Appl. Ent. (A) 19: 305. 1931.]

Control measures include repeated spraying of the young shoots in the spring with nicotine sulphate 1 to 500.

ANONYMOUS

(1418)

1928. TEN YEARS OF WORK (1918-1927). Collect. Papers on the Work of the Sci. Dept. Saratov Regional Agr. Expt. Sta. 278 pp., [Saratov]. [In Russian. Abstract in Rev. Appl. Ent. (A) 16: 489-490. 1928.]

Arsenical and tobacco dusts gave the best results against the flea beetle Chaetocnema breviscula Fald. on beets.

GÜNTHER, O.

(1419)

1931. PESTS OF BEET IN SPAIN. Anz. Schädlingesk. 7 (10): 112-116, illus. [In German. Abstract in Rev. Appl. Ent. (A) 20: 7. 1932.]

Proprietary dust insecticides and a spray containing tobacco extract, though effective against halticid beetles (Chaetocnema tibialis Ill.), are too costly.

CAMERON, A. E.

(1420)

1915. POTATO SPRAYING AND DUSTING IN NEW JERSEY. U. S. Amer. Bull. Ent. Res. 6 (1): 1-21, illus.

Tobacco dust killed 91.6 percent of the potato flea beetles (Epitrix cucumeris Harr.) treated; bordeaux, lead arsenate and Black Leaf 40, 52.9 percent; zinc arsenite and Black Leaf 40, 69.6 percent; lead arsenate and Black Leaf 40, 78.7 percent; lead chromate and Black Leaf 40, 25.4 percent; and Black Leaf 40 and soap, 60 percent (Table VII).

BRITTON, W. E., and ANDERSON, P. J.

(1421)

1926. TOBACCO INSECTS OBSERVED IN CONNECTICUT IN 1925. Conn. Agr. Expt. Sta. Tobacco Sta. Bull. 6, pp. 74T - 93T. [Abstract in Rev. Appl. Ent. (A) 14: 445. 1926.]

Spraying with 2 teaspoonsful of nicotine sulphate (40-percent) in 1 gal. water with a little soap in it is suggested for the control of the flea beetle Epitrix cucumeris Harr. on tobacco plants.

WALKER, H. G., and ANDERSON, L. D.

(1422)

1932. RECENT INVESTIGATIONS IN INSECT CONTROL AT THE VIRGINIA TRUCK EXPERIMENT STATION. Peninsula Hort. Soc. [Del.] Trans., pp. 20-24. [Abstract in Chem. Abs. 28: 5584. 1934.]

Good control of the potato flea beetle (Epitrix cucumeris Harris) was obtained with combination dusts of calcium arsenate, zinc sulphate, and lime (1:1:1), and paris green and lead arsenate (1:5). The addition of nicotine (1:400) improved the efficiencies of the sprays.

HANSON, A. J.

(1423)

1933. THE POTATO FLEA BEETLES EPITRIX CUCUMERIS HARRIS, EPITRIX SUBCRINITA LECONTE. Wash. Agr. Expt. Sta. Bull. 280, 27 pp., illus. [Abstract in Rev. Appl. Ent. (A) 21: 540-541. 1933.]

Tubers from potato plants sprayed with 9 applications of nicotine sulphate were almost as much injured as those from untreated plants, since no lasting toxic residue was left on the plants, and very few beetles came into actual contact with the sprays.

ANDERSON, L. D., and WALKER, H. G.

(1424)

1934. THE LIFE HISTORY AND CONTROL OF THE POTATO FLEA BEETLE, EPITRIX CUCUMERIS HARRIS, ON THE EASTERN SHORE OF VIRGINIA. Jour. Econ. Ent. 27: 102-106.

The addition of Black Leaf 40 to the bordeaux-calcium arsenate spray gave a slight increase in yield, but not enough to pay for the additional cost of the material; however, if aphids are abundant it might be profitably added.

BEINHART, E. G.

(1425)

1932. A CONTROL FOR THE TOBACCO FLEA BEETLE (EPITRIX PARVULA) Jour. Econ. Ent. 25 (6): 1187-1190. [Abstract in Rev. Appl. Ent. (A) 21: 73. 1933.]

A spray of 50 gal. bordeaux mixture (3:3:50 or 4:4:50), 2 lb. lead arsenate, and 1 pt. 40-percent nicotine sulphate appears to give better control of Epitrix parvula F. in tobacco seed beds than other materials used. A single application effected complete control of a severe attack of flea beetles (probably E. cucumeris Harr.) on tobacco in California in 1929, and effective practical control of E. parvula in tobacco seed beds of North Carolina was obtained with it in 1932.

CHAMBERLIN, F. S.

(1426)

1933. BARIUM FLUOSILICATE AS A CONTROL FOR THE TOBACCO FLEA BEETLE. Jour. Econ. Ent. 26 (1): 233-236. [Abstract in Rev. Appl. Ent. (A) 21: 245-246. 1933.]

Excellent control was obtained with dosages ranging from 4 to 8 lb. to the acre of tobacco using a mixture consisting of barium fluosilicate, infusorial earth, and tobacco dust in the proportions of 8:2:2, with two or three applications. Other tests on this beetle (Eptirix parvula F.) indicated that an 8:2 mixture of barium fluosilicate and tobacco dust was somewhat preferable. Neither of these mixtures caused commercial scorching or residue trouble when properly applied.

PICARD, F.

(1427)

1913. THE STRUGGLE AGAINST HALTICA IN HERAULT. Bull. Agr. Algérie et Tunisie No. 4, pp. 86-89. [In French. Abstract in Rev. Appl. Ent. (A) 1: 173-174. 1913.]

Nicotine is said to give good results in the Gironde but the author is of opinion that it protects the leaves in a less effective manner than arsenical compounds. If the second generation attacks severely, nicotine spray is the remedy.

FEYTAUD, J.

(1428)

1911. L'ALTISE DE LA VIGNE. Bull. Soc. Étude et Vulg. Zool. Agr. 10 (2): 49-64, illus.

Against flea beetles (Haltica ampelophaga Guér. Mén.) on grape vines a spray mixture, consisting of 1.33 l. titrated tobacco juice (133 g. pure nicotine) and 100 l. bordeaux, has been demonstrated as an effective control.

In the laboratory nicotine has been very active and larvae are at once paralyzed by the contact of this liquid. The ingestion of leaves treated with nicotine caused characteristic convulsions a few moments later, and death followed within a very short time (pp. 62-63).

DEGRULLY, L.

(1429)

1923. TRAITEMENTS CONTRE L'ALTISE (HALTICA AMPELOPHAGA). Prog. Agr. et Vitic. 79 (7): 149-153. February 18. [Abstract in Rev. Appl. Ent. (A) 11: 167. 1923.]

Sodium arsenate is the preferred remedy but for greater safety calcium arsenate or lead arsenate may be used, or pyrethrum-soap or nicotine.

DA CUNHA BUENO, A.

(1430)

1928. WORK AGAINST THE VINE BEETLES. Chacaras e Quintaes 37 (4): 392-393, illus. [In Portuguese. Abstract in Rev. Appl. Ent. (A) 16: 501. 1928.]

Measures against Haltica (Altica) ampelophaga Guér. attacking grape-vine leaves include the application of nicotine spray or dusts of tobacco and lime.

FULMEK, L.

(1431)

1931. THE CABBAGE FLEA-BEETLE AS A RARE PEST OF GRAPE-VINES. Das Weinland, No. 9, p. 289. [In German. Abstract in Rev. Appl. Ent. (A) 20: 238. 1932.]

The leaves of grape-vines in Austria were injured by Haltica oleracea L. Many of the flea beetles were found dead beneath the vines after they had been sprayed with bordeaux mixture containing 2 percent tobacco extract and 0.12 percent urania green.

NEWTON, H. C. F.

(1432)

1928. THE BIOLOGY OF FLEA-BEETLES (PHYLLOTRETA) ATTACKING CULTIVATED CRUCIFERAE. Jour. So. East. Col. Wye No. 25, pp. 90-115, illus. [Abstract in Rev. Appl. Ent. (A) 16: 615-616. 1928.]

Cress, previously untouched, was badly damaged by beetles that were driven from other plants by spraying with nicotine sulphate.

GRAM, E., and ROSTRUP, S.

(1433)

1923. PLANT DISEASES AND PESTS IN DENMARK IN 1922. Tidsskr. Planteavl. 29: 236-309. [In Danish. Abstract in Rev. Appl. Ent. (A) 11: 521. 1928.]

Experimental spraying with nicotine sulphate (0.1 percent) and with lead arsenate (0.2 percent) had good effects in controlling Phyllotreta nemorum and other flea beetles. Newly hatched larvae of Pteronous (Nematus) ribesii on gooseberry bushes were instantly killed by a spray of tobacco extract (0.2 percent). A tobacco extract containing free ammonia caused total defoliation.

BURKHARDT, F.

(1434)

1917. FLEA-BEETLES INJURIOUS TO AGRICULTURE AND GARDENING. Abt. f. Pflanzenkrank. Kaiser Wilhelm Inst. f. Landw. Flugbl. No. 26, March. [In German. Abstract in Rev. Appl. Ent. (A) 8: 237. 1920.]

Lime or soot with a little tobacco dust or sulphur added may be used against the flea beetles infesting peas, vetches, and cruciferae. The species include Phyllotreta nigripes F., P. atra F., P. cruciferae Goeze, P. undulato Kutsch., P. nemorum L., Psylliodes chrysocephala L., and P. napi F.

CHITTENDEN, F. H., and MARSH, H. O.

(1435)

1920. THE WESTERN CABBAGE FLEA-BEETLE. U. S. Dept. Agr. Bull. 902, 21 pp., illus. [Abstract in Rev. Appl. Ent. (A) 9: 203-204. 1921.]

The western cabbage flea beetle (Phyllotreta pusilla Horn) is a most troublesome pest of cabbage, turnips, and other cruciferous crops. Nicotine sulphate 1/2 pt. of 40-percent solution in 50 gal. water with 2 lb. soap added, or tobacco dust, may be used as deterrents.

AZOV, Z.

(1436)

1928. EXPERIMENTS FOR THE CONTROL OF FLEA-BEETLES ON CABBAGE SEEDLINGS BY MEANS OF CALCIUM ARSENITE AND OTHER INSECTICIDES. *Défense des Plantes* 5 (3-4): 372-374. [In French. Abstract in *Rev. Appl. Ent.* (A) 17: 137-138. 1929.]

Tobacco dust gave as good results as calcium arsenite by the third day upon Phyllotreta undulata Kutsch and P. nemorum L. on cabbage seedlings, nearly all the flea beetles being killed. The day following the application the pure calcium arsenite showed the best results, the paris green spray being the least effective.

YAROSLAVTSEV, G. N.

(1437)

1928. INSECT PESTS IN 1927. *Zapadan. Obl. S.-Kh. Op. Stantz.*, No. 29 (Ent. Otd. No. 1), 31 p. [In Russian. Abstract in *Rev. Appl. Ent.* (A) 17: 135-136. 1929.]

Flea beetles (Phyllotreta undulata, atra, vittata, nemorum, and armoraciae) appeared by the end of May and were abundant toward the end of June and beginning of July, when tobacco dusts had to be applied.

NEWTON, H. C. F.

(1438)

1929. OBSERVATIONS ON THE BIOLOGY OF SOME FLEA-BEETLES OF ECONOMIC IMPORTANCE. *Jour. So. East. Agr. Col. Wye*, No. 26, pp. 145-164, illus. [Abstract in *Rev. Appl. Ent.* (A) 17: 678-680. 1929.]

Spraying with nicotine for aphids killed a number of flea beetles (Psylliodes attenuata Koch) on hops.

ZIMMERMANN, F., and LINKE, W.

(1439)

1929. TESTS WITH INSECTICIDES AGAINST FLEA-BEETLES IN HOP CULTIVATION. *Landw. Fachpresse Tschechoslow.* 6: 180-181. [Prague]. [In German. Abstract in *Rev. Appl. Ent.* (A) 18: 266. 1930.]

Calcium arsenate dust proved very effective against flea beetles (Psylliodes attenuata Koch) in Bohemia, and a 2 percent solution of tobacco extract, though somewhat less effective, was quite satisfactory.

MASSEE, A. M.

(1440)

1931. NOTES ON MITES AND INSECT PESTS FOR THE YEARS 1928-1930. *East Malling Res. Sta.* 16th - 18th Ann. Rept. 1928-1930, Pt. 2 (suppl.), pp. 189-201, illus. Kent. [Abstract in *Rev. Appl. Ent.* (A) 19: 637-638. 1931.]

Psylliodes attenuata Koch caused considerable damage to hops in England. A 3 percent nicotine dust and sprays of lead arsenate or nicotine proved ineffective against these beetles.

BLUNCK, H.

(1441)

1922. THE ACTION OF ARSENICAL POISONS ON PESTS OF OIL CROPS AS OBSERVED AT THE NAUMBURG BRANCH OF THE IMPERIAL BIOLOGICAL INSTITUTE. Verhandl. Deut. Gesell. Angew. Ent. 3 Mitgliederversammlung zu Eisenach 28 bis 30 September 1921, pp. 40-55; Berlin. [In German. Abstract Rev. Appl. Ent. (A) 11: 130. 1923.]

Nicotine sprays give fair results against flea beetles such as the cabbage flea beetles (Phyllotreta spp.) and the rape flea beetle (Psylliodes chrysocephala).

CHITTENDEN, F. H.

(1442)

1909. THE HOP FLEA-BEETLE (PSYLLIODES PUNCTULATA MELSH.). U. S. Dept. Agr. Bur. Ent. Bull. 66, Pt. VI, pp. 71-82, illus.

Quayle says that a spray, containing Black Leaf tobacco extract (1 gal. to 65 gal. of water), seemed more effective than kerosene emulsion against this pest on hop plants (p. 86).

PARKER, W. B.

(1443)

1910. THE LIFE HISTORY AND CONTROL OF THE HOP FLEA-BEETLE (PSYLLIODES PUNCTULATA MELSH.) U. S. Dept. Agr. Bur. Ent. Bull. 82, Pt. IV, pp. 33-58, illus.

A combination of bordeaux mixture and Black Leaf tobacco extract served as a deterrent and should prove effective. Tobacco dust is more effective on mangels than on hops, because the plants are close to the ground and can be more readily covered with the powder (p. 54).

Flea-beetles which were thoroughly drenched with Black Leaf tobacco extract at the rate of 1 gal. to 65 gal. water soon died, but many beetles jumped through the spray and escaped (p. 56).

MULLER-THURGAU, H., OSTERWALDER, A., and SCHNEIDER-ORELLI, O.

(1444)

1917. PLANT PHYSIOLOGICAL AND PLANT PATHOLOGICAL DIVISION. Landw. Jahrb. Schweiz. 31: 416-426. [In German.]

A 2-percent tobacco-soap solution may be considered an effective and convenient means of controlling Trioza alacris (laurel flea beetle), Trophocyna rosae, and Stephanitis pyrioides (p. 425).

2. Cucumber, Asparagus, and Raspberry Beetles, 1899-1933

MOREIRA, C.

(1445)

1921. A PEST OF EGG-PLANTS. Chacaras e Quintaes 24 (5): 392, illus.
[In Portuguese. Abstract in Rev. Appl. Ent. (A) 10: 86. 1922.]

Formulae recommended against Diabrotica speciosa, damaging egg-plants, watermelons, tomatoes, etc., are: (1) tobacco extract (containing 7 percent nicotine and 1 percent carbolic acid) 3 qt. and water 25 gal.; (2) tobacco extract 2 to 3 qt., soft soap 5 to 6 1/4 lb., and water 25 gal.

SELL, R. A.

(1446)

1915. SOME NOTES ON THE WESTERN TWELVE-SPOTTED AND THE WESTERN STRIPED CUCUMBER BEETLES. Jour. Econ. Ent. 8: 515-520. [Abstract in Rev. Appl. Ent. (A) 4: 68-69. 1916.]

Tobacco extract, one teaspoonful to a gallon of water, was a successful remedy against the western striped cucumber beetle (Diabrotica trivittata).

CHITTENDEN, F. H.

(1447)

1899. SOME INSECTS INJURIOUS TO GARDEN AND ORCHARD CROPS. U. S. Dept. Agr. Div. Ent. Bull. 19, 99 p., illus.

Andrus and Stauffer state that when there is an abundant supply of tobacco stems, a liberal plowing under of 1 or 2 tons to the acre is effective against the striped cucumber beetle (Diabrotica vittata Fab.). The tobacco ribs were used in lieu of manure, and as soon as the cucumber plants appeared above ground they were treated with tobacco dust at weekly intervals. The ribs on the ground about the roots appeared to be more effective than the dust on the plants (p. 50).

WEBSTER, F. M., and NEWELL, W.

(1448)

1902. INSECTS OF THE YEAR IN OHIO. U. S. Dept. Agr. Div. Ent. Bull. 31, n.s. pp. 84-90.

Tobacco dust was ineffective against beetles (Doryphora decemlineata, Phyllotreta vittata, and Diabrotica vittata) (p. 90).

HEADLEE, T. J.

(1449)

1908. LIFE HISTORY OF THE STRIPED CUCUMBER BEETLE WITH A BRIEF ACCOUNT OF SOME EXPERIMENTS FOR ITS CONTROL. Jour. Econ. Ent. 1: 203-209.

Tobacco dust seemed to be fairly efficient against this beetle (Diabrotica vittata) when carefully used, but it was no better than sulphur or air-slaked lime.

MOORE, WM.

(1450)

1914. TRUCK CROP INSECTS. Minn. State Ent. 15th Rept. 1913 and 1941, pp. 64-68, illus. [Abstract in Rev. Appl. Ent. (A) 3: 162-163. 1915.]

Tobacco fumigation is recommended for the control of the melon aphid. One teaspoonful of "Nicofume" or similar tobacco extract to each gal. water kills cucumber beetle (Diabrotica) larvae on the underground parts of the plant.

GOSSARD, H. A.

(1451)

1917. THE STRIPED CUCUMBER BEETLE. SUGGESTED REMEDIES FOR CONTROLLING THIS PEST ON CUCURBITS. Ohio Agr. Expt. Sta. Monthly Bull. 2 (4): 117-120, illus. [Abstract in Rev. Appl. Ent. (A) 5: 370-371. 1917.]

A method of combating Diabrotica vittata is to dust most of the plants with tobacco, fine ashes or lime, the undusted ones, on which the beetles naturally prefer to feed, being sprayed with a solution of 6 lb. lead arsenate paste in 50 gal. of water, thus acting as traps.

BRITTON, W. E.

(1452)

1918. SEVENTEENTH REPORT OF THE STATE ENTOMOLOGIST OF CONNECTICUT, 1917. Conn. Agr. Expt. Sta. Bull. 203, pp. 228-370, illus.

Q. S. Towry tried tobacco dust as a repellent against the striped cucumber beetle (Diabrotica vittata Fab.) without great success (p. 270). Black Leaf 40 was also tried against this beetle (p. 271).

W. E. Britton and Q. S. Towry successfully used Black Leaf 40 against the potato aphid (Macrosiphum solanifolii Ashm.) (p. 291). They discuss control methods, using nicotine solutions, such as "Black Leaf 40", "Nikoteen", and "Pratts Nicotine" (pp. 300-301).

SCHIFFMANN

(1453)

1912. ZUR VERTILGUNG DER SPARGELKÄFER. Gartenwelt 16: 638.

Dusting the asparagus beetle on asparagus with tobacco dust was ineffective.

WAHL, B.

(1454)

1916. ASPARAGUS BEETLES. Wiener Landw. Ztg. 66:267. [In German. Abstract in Rev. Appl. Ent. (A) 6: 409. 1918.]

The following is one of the insecticides recommended against the larvae of the asparagus beetle (Crioceris asparagi): A solution of 5 lb. tobacco extract and 1 pt. lysol in 50 gal. water.

BURR, A.

(1455)

1922. PARASITES DES ASPERGES DANS LES CULTURES D'ALSACE. Bull. Assoc. Philomath. Alsace et Lorraine 6 (1921) pt. 3, pp. 43-52. [Abstract in Rev. Appl. Ent. (A) 10: 630-631. 1922.]

The most satisfactory spray for general purposes against the cynrysomelids Crioceris asparagi L. and C. duodecimpunctata L. consists of 1/4 lb. nicotine, 1/2 lb. carbonate of soda, 2 1/2 lb. black soap and 1 qt. methylated spirits in 25 gal. of water.

BRITTON, W. E.

(1456)

1928. TWENTY-SEVENTH REPORT OF THE STATE ENTOMOLOGIST OF CONNECTICUT 1927. Conn. Agr. Expt. Sta. Bull. 294, pp. 193-303, illus.

Using Black Leaf 40 (2 teaspoonfuls to 1 gal. water) the author was readily able to kill the grubs of the asparagus beetles (Crioceris asparagi Linn. and C. duodecimpunctata Linn.) (p. 203).

Myzus persicae Sulz. and Illinoi pisi Kalt. can be controlled by nicotine spray or nicotine dust (p. 204).

Tests with insecticides designed to do the work of nicotine sulphate are briefly reported by Garman (pp. 277-278).

SHOMERUS

(1457)

1925. DIE SPARGELKÄFER. Ztschr. Obst. Wein u. Gartenbau 51: 170-171.

A 1 percent tobacco extract is recommended in Germany against the asparagus beetle.

LIBERA, T.

(1458)

1912. DER HIMBEERKÄFER, BYTURUS FUMATUS. Möller's Deut. Gärt. Ztg. 27: 330.

Spraying with a 4-percent nicotine solution is recommended as a control for the above beetle on raspberries. Spray only in the very early morning or late in the evening, and begin to spray 8 to 10 days before blossoming time and repeat spraying once a week till fruits are half grown.

LEES, A. H.

(1459)

1917. THE RASPBERRY AND LOGANBERRY BEETLE (BYTURUS TOMENTOSUS). Long Ashton, Bristol, Agr. and Hort. Res. Sta. Ann. Rept. for 1917, pp. 35-36. [Abstract in Rev. Appl. Ent. (A) 6: 424. 1928.]

Good results have been obtained by the experimental use of 20 lb. soft soap, 2 gal. paraffin and 1/2 lb. nicotine in 100 imperial gal. water. In practice it was found necessary to give a preliminary spraying to force the insects from their hiding places and for this the 2 percent paraffin emulsion without nicotine was used.

POETEREN, N. VAN

(1460)

1932. REPORT OF THE WORK OF THE PHYTOPATHOLOGICAL SERVICE IN 1931. Verslag. en Meded. Plantenziektenkund. Dienst Wageningen No. 66, 134 pp., illus. [In Dutch. Abstract in Rev. Appl. Ent. (A) 20: 566. 1932.]

Spraying with paris green or nicotine has given good results against the cabbage beetle (Meligethes aeneus L.). A spray of 1 per mille nicotine (95-98 percent) has been found effective against the raspberry beetle (Byturus tomentosus F.), and one of 2 per mille proved excellent against Phytomyza chrysanthemi Kowartz on Chrysanthemum if it is carefully and thoroughly applied.

STEER, W.

(1461)

1932. FURTHER OBSERVATIONS ON THE HABITS OF THE RASPBERRY BEETLE (BYTURUS TOMENTOSUS FABR.) WITH SPECIAL REFERENCE TO THE CONTROL OF THE PEST BY MEANS OF DERRIS. Jour. Pomol. Hort. Sci. 10 (1): 1-16, illus. [Abstract in Rev. Appl. Ent. (A) 20: 331-332. 1932.]

In view of the exposed condition of the larvae a spray of 8 oz. nicotine, 10 lb. soap and 100 gal. water was applied on July 1, 6 days before the picking of the crop began; the percentage of infestation was reduced from 70.9 to 36.5.

PETHERBRIDGE, F. R., and THOMAS, I.

(1462)

1932. THE CONTROL OF THE RASPBERRY BEETLE. Jour. Min. Agr. [Gt. Brit.] 39 (11): 1017-1028, illus. [Abstract in Rev. Appl. Ent. (A) 21: 170-171. 1933.]

Experiments on the control of this beetle (Byturus tomentosus F.) are described. The damage on raspberries sprayed with 10 oz. nicotine sulphate and 5 lb. soft soap in 40 gal. water was 4.6 percent as compared with 84.8 percent on unsprayed plants.

STEER, W.

(1463)

1933. STUDIES ON BYTURUS TOMENTOSUS FABR. III. FURTHER EXPERIMENTS ON ITS CONTROL ON RASPBERRIES, LOGANBERRIES AND BLACKBERRIES. Jour. Pomol. Hort. Sci. 11 (1): 19-38, illus. [Abstract in Rev. Appl. Ent. (A) 21: 294-295. 1933.]

Two late applications of a spray containing 0.05 percent nicotine and 1 percent soft soap reduced infestation on raspberries from 73.8 to 5.1 percent, but was more expensive than the derris spray.

BAKER, W. W.

(1464)

1929. REPORT OF THE DEPARTMENT OF ENTOMOLOGY. West Wash. Expt. Sta. Ann. Rept. 1928-1929, pp. 10-16. [Abstract in Rev. Appl. Ent. (A) 18: 541-542. 1930.]

Nicotine dusts sometimes killed a large number of raspberry beetles (Eyturus unicolor Say) but their effectiveness varied in different years.

3. Other Beetles, 1905-1934

FRICKHINGER, H. W.

(1465)

1932. SOME LITTLE KNOWN PESTS OF MEADOW LANDS. A COMPILATION FROM THE LITERATURE. Prakt. Bl. Pflanzenbau u. Schutz, 10 (1-2): 33-37. [In German. Abstract in Rev. Appl. Ent. (A) 20: 382. 1932.]

Loss of red clover seed is caused by the larvae of a weevil (Apion apricans Hbst.), which feed in the blossoms. A spray of nicotine and soap is suggested.

CHITTENDEN, F. H.

(1466)

1915. THE VIOLET ROVE-BEETLE. U. S. Dept. Agr. Bull. 264, 4 pp., illus.

Pauls reports that he was successful in ridding his garden of this pest (Apocellus sphaericollis Say.), at least on three of his pansy beds, by dusting them with tobacco in 1905.

LANGENBUCH, R., and SCHEWKET, N.

(1467)

1931. ON THE BIONOMICS OF BEETLES (ATOMARIA LINEARIS STEPH.). Nachrbl. Deut. Pflanzenschutzdienst. 11 (3): 17-19, illus. [In German. Abstract in Rev. Appl. Ent. (A) 19: 380. 1931.]

Experiments showed that the beetles on sugar-beet seedlings are but little susceptible to sodium fluoride or arsenical compounds, nor did treatment of beet-seed with naphthalene prove of any value, spraying with nicotine being the only measure of any use.

HUSAIN, M. A., and SHAH, S. A.

(1468)

1926. THE RED PUMPKIN BEETLE AULACOPHORA ABDOMINALIS FB. AND ITS CONTROL; WITH A SHORT NOTE ON A. ATRIPENNIS FB. India Dept. Agr. Mem., Ent. Ser. 9 (4): 31-57, illus. [Abstract in Rev. Appl. Ent. (A) 14: 423-424. 1926.]

Ashes, slaked lime or road dust mixed with tobacco dust or kerosene are often used as repellents, but poison dusts give better results. Sprays recommended include a tobacco decoction made of six parts tobacco refuse and 1 1/2 parts soap to 600 parts water.

MORGAN, W. L.

(1469)

1933. THE PUMPKIN BEETLE AULACOPHORA HILARIS FOISD. Agr. Gaz. N. S. Wales 44 (11-12): 811-815, 915-922, illus. [Abstract in Rev. Appl. Ent. (A) 22: 138-139. 1934.]

Hydrated lime and tobacco dust (equal parts) proved the best of a number of dusts tested for protecting young plants.

LESNE, P.

(1470)

1907. LES INSECTES DE L'ARTICHAUT. Jour. Agr. Prat. 71 (t.14):
49-52, illus.

Against a beetle (Cassida deflorata Suffr.) which infests the artichoke the following spray mixture is recommended: 10 cc. concentrated tobacco juice, 10 g. black soap, 2 g. sodium carbonate, 10 cc. methyl alcohol, and 1 l. water.

MARTINET, G.

(1471)

1925. LE CRIOCERE DE L'AUVERNE. Terre Vaudoise 17 (23): 340. [Abstract in Rev. Appl. Ent. (A) 13: 376. 1925.]

A solution with a nicotine or arsenical basis is recommended for the control of a small species of Crioceris.

KADOCSA, GY.

(1472)

1916. CRIOCERIS MELANOPA (LEMA MELANOPUS) INJURIOUS TO OATS AND BARLEY IN HUNGARY. Monthly Bull. Agr. Intel. and Plant Diseases 7 (2): 312-314. [Abstract in Rev. Appl. Ent. (A) 4: 350-351. 1916.]

Thanetone (a nicotine preparation) and nicotine sulphate gave the best results when the nicotine content was from 0.4 to 0.5 oz. per gal. of water.

HOPKINS, A. D.

(1473)

1909. BARK-BEETLES OF THE GENUS DENDROCTONUS. U. S. Dept. Agr. Bur. Ent. Bull. 83, Pt. 1, 169 pp., illus.

Coating the trunks of trees with a preparation of tobacco water, Spanish blood, lime, fresh cow dung, etc., is recommended as a preventive against the European spruce-beetle (Dendroctonus micans Kug.) (p. 142).

MERRILL, D. E.

(1474)

1917. THE BEAN BEETLE (EPILACHNA CORRUPTA MULS.) N. Mex. Agr. Expt. Sta. Bull. 106, 30 pp., illus. [Abstract in Rev. Appl. Ent. (A) 6: 299-300. 1918.]

A spray of Black Leaf 40 (1:800) plus 4 lb. soap per 100 gal. killed very young larvae when they were hit by it, but it had no effect on older stages.

MCINDOO, N. E.

(1475)

1931. TROPISMS AND SENSE ORGANS OF COLEOPTERA. Smithsn. Misc. Collect. 82 (18): 1-70, illus.

To ascertain whether nicotine would keep Mexican bean beetles (Epilachna corrupta Muls.) (= Epilachna varivestis Muls.) away from treated leaves in four small cages in the laboratory, bean foliage was sprayed with 40-percent nicotine sulphate and lime (combined as a dust) and with nicotine sulphate in water (1 to 400). The beetles feeding on untreated leaves had a value of 1.00, while those on the treated leaves had values of 0.87 and 0.85, showing that the nicotine preparations were slightly repellent (pp. 42-43).

BOURNE, A. I., and WHITCOMB, W. D.

(1476)

1934. DEPARTMENT OF ENTOMOLOGY. Mass. Agr. Expt. Sta. Bull. 305, pp. 28-26. [Abstract in Rev. Appl. Ent. (A) 22: 473-474. 1934.]

Sprays of nicotine sulphate (1:800) were efficient in reducing the number of larvae of the Mexican bean beetle, but allowed reinfestation to take place. Against the onion thrips a spray of nicotine sulphate and fish-oil soap was the most effective.

TAKAGI, S., and ITO, K.

(1477)

1932. STUDIES ON EPILACHNA NIPONICA LEW. Fukushima Agr. Expt. Sta. [Japan] 50 pp., illus. [In Japanese. Abstract in Rev. Appl. Ent. (A) 20: 495. 1932.]

Lead arsenate is considered the best insecticide for control of this beetle, though derris, pyrethrum, and nicotine sulphate are all very effective.

CUSHMAN, R. A., and ISELY, D.

(1478)

1916. THE CHERRY LEAF BEETLE, A PERIODICALLY IMPORTANT ENEMY OF CHERRIES. U. S. Dept. Agr. Bull. 352, 26 pp., illus. [Abstract in Rev. Appl. Ent. (A) 4: 309-311. 1916.]

For the control of the chrysomelid Galerucella cavicolis Lec. (cherry leaf beetle) nicotine sulphate (40-percent) at 1 to 600, with or without soap, was effective as a contact spray. Weaker solutions though apparently effective at the time of application did not have a permanent effect.

HARTZELL, F. Z., and PARROTT, P. J.

(1479)

1916. THE CHERRY LEAF-BEETLE. N. Y. Agr. Expt. Sta. Circ. 49, 3 pp., illus. [Abstract in Rev. Appl. Ent. (A) 4: 341. 1916.]

The most suitable control measure is to spray cherry and peach trees as soon as the adults (Galerucella cavicolis Lec.) appear with nicotine sulphate (40-percent) 1/2 pt. in 60 to 80 gal. water.

HUTCHINSON, H. P., and KEARNS, H. G. H.

(1480)

1931. THE CONTROL OF GALERUCELLA LINEOLA - MAJOR PEST OF WILLOWS. Bristol Agr. Hort. Res. Sta. Rept. 1930, pp. 108-111. [Abstract in Rev. Appl. Ent. (A) 19: 602. 1931.]

As a result of both field and laboratory tests, it was found that effective control may be obtained by thorough spraying against the immature larvae about the third week of June with 3/4 oz. nicotine, 1 lb. soft soap and 10 gal. water.

BRASCASSAT, M.

(1481)

1922. GALERUCA CALMARIENSIS FAB. Verb. Soc. Lin. Bordeaux Proc. 74
(1): 38-39. [Abstract in Rev. Appl. Ent. (A) 11: 238. 1923.]

In the spring the following wash should be applied: 2 1/2 lb. sulphur, 5 lb. soot and 3 1/2 lb. tobacco extract in 5 gal. water for the control of Galerucella luteola Mull. (= Galeruca calmariensis F.) on elm.

BRITTON, W. E.

(1482)

1932. THE ELM LEAF BEETLE OUTBREAK. Conn. Agr. Expt. Sta. Circ. 84, pp. 29-34, illus. [Abstract in Rev. Appl. Ent. (A) 20: 675-676. 1932.]

Where the lead arsenate treatment has not been applied or has proved unsuccessful, the pupae of this beetle (Galerucella luteola Mull.) round the base of the tree may be killed by spraying with nicotine sulphate and soap.

DIANTHUS

(1483)

1923. UN INSETTO DANNOSO AI GIOVANI OLMI. Coltivatore 69: 425.

Against elm beetles on young nursery stock a 1 percent phenicated tobacco solution is recommended in Italy. Spray this solution when the first beetles appear.

ZORIN, P. V.

(1484)

1931. GUELDER ROSE LEAF-BEETLE (GALERUCELLA VIBURNI) PAYK. Bull. Inst. Controlling Pests and Diseases, No. 1, pp. 55-79, illus. [In Russian. Abstract in Rev. Appl. Ent. (A) 20: 151. 1932.]

The larvae may be killed by an application of tobacco dust.

HOFFMANN, A.

(1485)

1929. NOTE SUR LES MOEURS ET LES DEGATS DE HYPERA ARATOR L. (COL. CURCULIONIDAE). Bull. Soc. Ent. France 1929, No. 4, pp. 47-52. [Abstract in Rev. Appl. Ent. (A) 17: 410-411. 1929.]

The spray formula that gave the most satisfactory results consisted of 2 lb. nicotine, 8 lb. soft soap, 0.3 gal. alcohol (90-percent) and 100 imperial gal. soft water. The soap should be dissolved separately.

SANDERS, J. G., and FRACKER, S. B.

(1486)

1916. LACHNOSTERNIA RECORDS IN WISCONSIN. Jour. Econ. Ent. 9: 253-261, illus. [Abstract in Rev. Appl. Ent. (A) 4: 283-284. 1916.]

In tests to control the white grubs, kerosene emulsion and 40-percent nicotine sulphate were found useless.

MESNIL, L.

(1487)

1931. CONTRIBUTION TO THE STUDY OF THREE COLEOPTEROUS INSECTS INJURIOUS TO CEREALS. Ann. Epiphyties 16 (1930), No. 3-4, pp. 190-203, illus. [Abstract in Rev. Appl. Ent. (A) 19: 658. 1931.]

Control measures against these beetles (Lema) include the cultivation of winter wheat and spraying with a mixture of pyrethrum and nicotine sulphate.

SCHWÖRER

(1488)

1925. A DEVASTATING OCCURRENCE OF LEMA CYANELLA L. Badische Bl. für Schädlingsbekämpfung 1 (5): 67-68. [In German. Abstract in Rev. Appl. Ent. (A) 13: 530. 1925.]

The young larvae of the above beetle were sprayed with a solution of 2 lb. tobacco extract in 10 gal. water. Only 3 percent of the larvae survived this treatment. The effect of the spray can be increased by adding 2 lb. of slaked lime.

MIESTINGER, K.

(1489)

1910. ZUR BEKÄMPFUNG DES GETREIDEHÄHNCHENS. Monatsh. Landw. 3 (11): 331-333, illus.

Against the beetles Lema melanopa L. and L. cyanella L. on wheat and other cereals Sajo in Hungary recommends the following spray mixture: 2 to 2.5 kg. tobacco extract, 2 to 2.5 kg. unslaked lime, and 600 to 700 l. water.

VASSILIEV, E. M.

(1490)

1913. THE CHIEF REMEDIES AGAINST THE LARVAE AND BEETLES OF LEMA MELANOPUS L., A PEST OF SUMMER-SOWN GRAIN. Studies from the Expt. Ent. Sta. of the All-Russian Soc. of Sugar-refiners for the year 1912. Kiev, pp. 1-2. [In Russian. Abstract in Rev. Appl. Ent. (A) 1: 479. 1913.]

Against this pest on oats, barley, and wheat in Russia a 1 to 2 percent tobacco extract is suggested as a remedy in the lower and wet region in the Government of Charkov.

FEYTAUD, J.

(1491)

1924. UN PARASITE DE LA MILIADE LEMA FLAVIPES SUFFR. Rev. Zool. Agr. et Appl. 23 (7): 158-161. [Abstract in Rev. Appl. Ent. (A) 12: 504. 1924.]

For France, in cases of severe infestation bordeaux mixture with nicotine or a solution containing 1.5 percent soft soap and 0.15 percent pure nicotine using about 50 to 60 gal. per acre is advocated for the control of the eriocerid, Lema tristis Hrbst. (= Flavipes Suffr.).

MOORE, WM., AND GRAHAM, S. A.

(1492)

1918. TOXICITY OF VOLATILE ORGANIC COMPOUNDS TO INSECT EGGS. Jour. Agr. Res. 12: 579-587.

In the laboratory, eggs of the Colorado potato beetle (Leptinotarsa decemlineata Say.) were dipped into a nicotine solution and immediately removed, and others were sprayed with the solution. All of the treated eggs failed to hatch.

BRITAIN, W. H.

(1493)

1925. SOME MISCELLANEOUS INSECTICIDE TESTS. Acadian Ent. Soc. Proc. 1924, No. 10, pp. 23-42. [Abstract in Rev. Appl. Ent. (A) 13: 495-496. 1925.]

Nicotine sulphate killed 31 percent of Colorado potato beetle larvae and adults (Leptinotarsa decemlineata Say.). Fish-oil soap alone, 6 lb. to 40 gal., was about equally effective. Nothing was gained by adding nicotine sulphate or fish-oil soap to the bordeaux spray. Nicotine sulphate controlled an aphid, Cavariella sp., on parsnips. Satisfactory results against Alsophila pometaria Harr. were obtained with a spray containing soluble sulphur 1-50 with nicotine sulphate 1 pt. - 100 gal. with or without the addition of 4 lb. fish-oil soap. Nicotine sulphate alone is not quite so good as with fish-oil soap.

FEYTAUD, J.

(1494)

1913. THE ENEMIES OF THE OSIER, THE LARGE RED CHRYSOMELID LINA (MELASOMA) POPULI LINN. Rev. Phytopath. Appl. 1 (3): 37-39, July 5. [In French. Abstract in Rev. Appl. Ent. (A) 1: 323-334. 1913.]

Insecticides containing nicotine give excellent results because they not only poison the insects and the larvae but also prevent oviposition. Red osier, Salix fragilis, sprayed with Burgundy mixture containing 1.3 percent nicotine yielded more osier than areas sprayed with either copper or nicotine alone.

LEWIS, H. C., and GAMMON, C.

(1495)

1928. THE VEGETABLE WEEVIL FOR THE SEASON 1927-1928. Calif. Dept. Agr. Monthly Bull. 17 (9): 482-492. [Abstract in Rev. Appl. Ent. (A) 17: 35-36. 1929.]

Contact sprays that have given good results against Listroderes obliquus Gyll. on such crops as spinach, turnips, and other vegetables for which arsenicals cannot be used are a 2 percent emulsion of a light, highly refined white oil with nicotine sulphate (1:800) and a pyrethrum spray using 5 lb. to 100 gal. water.

HORI, M.

(1496)

1932. STUDIES ON THE CLOVER LEAF-BEETLE, LUPERODES PRAEUSTUS MOTSCHULSKY, IN SOUTHERN SAGHALIEN. Saghalien Cent. Expt. Sta. Rept. (1), No. 2, 105 pp., illus. [In Japanese with an English summary. Abstract in Rev. Appl. Ent. (A) 22: 19. 1934.]

Control measures recommended against this beetle include spraying with nicotine sulphate and soap against the eggs.

RUNNER, G. A., and EYER, J. R.

(1497)

1927. EXPERIMENTS IN THE CONTROL OF THE ROSE-CHAFER, MACRODACTYLUS SUBSPINOSUS FAB., IN VINEYARDS. Jour. Econ. Ent. 20: 194-195. [Abstract in Rev. Appl. Ent. (A) 15: 262-263. 1927.]

Many of the materials tested, including nicotine, were only slowly toxic and did not protect the vines.

TESI, B.

(1498)

1929. EXTERMINATORS FOR BEET PARASITES. Indus. Saccarif. Ital. 22: 1; Listy Cukrovar. Rozhledy 47: 26. [In Italian and Czechoslovakian. Abstract in Chem. Abs. 23: 4765. 1929.]

The following preparations were effective especially against cockchafers: (1) tobacco dust 40 percent, flowers of sulphur 30 percent, finely ground naphthalene 30 percent; (2) tobacco dust 50 percent, dried "sana" 50 percent.

LENGERKEN, H. VON

(1499)

1920. A NEW MORDELISTENA FROM COLOMBIA AS A PEST OF CULTIVATED ORCHIDS. Ztschr. Angew. Ent. 6 (2): 409-411. [In German. Abstract in Rev. Appl. Ent. (A) 9: 67. 1921.]

Fumigation with substances containing nicotine appear to give good results against adult beetles of Mordellistena beyrodti attacking the leaves of Cattleya labiata in an orchid house.

TEMPLE, W.

(1500)

1926. THE OCCURRENCE OF MORDELISTENA CATTLEYANA ON ORCHIDS. Kranke Pflanze 3 (9): 161-164, illus. [In German. Abstract in Rev. Appl. Ent. (A) 14: 562. 1926.]

The collection of the adult beetles and fumigation with nicotine are the measures advocated.

GLENN, P. A.

(1501)

1915. THE APPLE FLEA-WEEVIL IN ILLINOIS. Jour. Econ. Ent. 7: 279-286.
[Abstract in Rev. Appl. Ent. (A) 3: 456. 1915.]

The beetles (Orchestes canus) were easily killed with kerosene emulsion and nicotine sprays. A 7 percent kerosene emulsion and Black Leaf 40 at the rate of 1 pt. to 100 gal. water were used.

NASH, R. W.

(1502)

1934. THE WILLOW FLEA WEEVIL, ORCHESTES RUFIPES LEC., AND ITS CONTROL IN MAINE. Jour. Econ. Ent. 27: 336-339.

Nicotine sulphate (1 : 600) plus liquid rotash soap (1 : 500) gave a 93 percent control after two applications. One application gave a 93 percent reduction in mines.

FERNALD, H. T.

(1503)

1916. REPORT OF THE DEPARTMENT OF ENTOMOLOGY. Mass. Agr. Expt. Sta. 28th Ann. Rept., Pt. 1, pp. 65-a - 68. [Abstract in Rev. Appl. Ent. (A) 4: 528. 1916.]

To prevent oviposition by strawberry crown girdler (Otiorrhynchus ovatus L.) near unaffected white pine and other trees in a forest nursery, the ground immediately round their stems was heavily sprayed with whale-oil soap solution (1 lb. soap in 4 gal. water), kerosene emulsion and Black Leaf 40, in different parts of the nursery.

FEYTAUD, J.

(1504)

1918. ÉTUDE SUR L'OTIORHYNQUE SILLONNE (OTIORRHYNCHUS SULCATUS F.). Ann. Serv. Epiphyties 5 (1916-1917): 145-192, illus. [Abstract in Rev. Appl. Ent. (A) 7: 465-466. 1919.]

From May to September, while the adults are on the trees, solutions such as bordeaux mixture, nicotine-sulphur sprays, bordeaux mixture with nicotine or aloes etc., act as repellents and stop the spread of infestation; these need renewing every 8 or 10 days during June, July, and August.

WAHL, C. VON

(1505)

1912. VERSUCHE GEGEN DEN MEERRETTICHKÄFER (PHAEDON COCHLEARIAE). Ber. Hauptstelle f. Pflanzenschutz in Baden für 1911, pp. 82-87, illus.

A spray mixture, consisting of 1.5 parts titrated nicotine, 3 parts soft soap, and 100 parts water, had a quick and good effect against this horseradish beetle. It is recommended in Baden (Germany).

WILSON, H. F.

(1506)

1909. THE PEACH-TREE BARKBEETLE (PHLAETOTRIBUS LIMINARIS HARR.). U. S. Dept. Agr. Bur. Ent. Bull. 68, pt. 9, pp. 91-108, illus.

All the gum and rough bark of 72 peach trees were scraped off and the following mixture was applied with a broom: One bushel tobacco stems was boiled 1 hour in 4 gal. water; 1/2 bushel stone lime and 4 qt. salt were added; 1/2 pt. crude carbolic acid was used in each 12 qt. of the liquid. Good results were obtained; the white wash stuck well, and the insects did not attack the trees till long after the wash fell off the trees. (pp. 102, 104).

FEYTAUD, J.

(1507)

1908. LES CHRYSOMÉLES DE L'OSIER. Bull. Soc. Étude et Vulg. Zool. Agr. 7 (5): 141-148.

Against a chrysomelid beetle (Phratora vulgatissima) on willows a spray mixture, applied by Danguy and consisting of 1 to 3 l. titrated tobacco juice, 0.2 kg. sodium carbonate, 1 kg. black soap, 1 l. denatured alcohol, and 100 l. water killed 80 percent of the beetles. The author used a mixture, consisting of 1 l. titrated nicotine, 2 kg. copper sulphate, 1 kg. sodium carbonate, and 100 l. water. After the treatment all the adult beetles left the sprayed square and none was found the following day (pp. 142-143).

(1508)

1908. LES CHRYSOMÉLES DE L'OSIER-ESSAIS DE DESTRUCTION PAR LES LIQUIDES INSECTICIDES. Rev. Vitic. 30: 344-348, 374-378, 404-409. 1908.

Against a chrysomelid beetle (Phratora vulgatissima) on willows in France a bordeaux-nicotine (1-percent) mixture, consisting of 1 l. titrated nicotine, 2 kg. copper sulphate, 1 kg. sodium carbonate, and 100 l. water, was successfully applied (p. 13 of separate).

LEES, A. H.

(1509)

1925. EXPERIMENTS ON THE CONTROL OF WILLOW BEETLES. Ann. Rept. Agr. and Hort. Res. Sta. 1924, pp. 120-122. [Abstract in Rev. Appl. Ent. (A) 13: 483. 1925.]

Laboratory tests were made against Phyllodecta vitellinae. Experiments with soap and nicotine with or without paraffin indicated that the addition of paraffin made no difference. Nicotine sulphate 30 oz. to 100 imperial gal. killed 100 percent. Eight oz. nicotine (= 20 oz. nicotine sulphate) killed only 32 percent of the beetles.

KLOTI-HAUSER, E.

(1510)

1922. A DANGEROUS PEST OF WILLOWS. Schweiz. Ent. Anz. 1 (5): 33. [In German. Abstract in Rev. Appl. Ent. (A) 12: 391. 1924.]

Spraying with nicotine against the willow-leaf beetle (Phyllodecta vulgatissima L.) is not quite reliable.

FLEMING, W. E.

(1511)

1925. THE COMPARATIVE VALUE OF CARBON BISULPHIDE AND OTHER ORGANIC COMPOUNDS AS SOIL INSECTICIDES FOR CONTROL OF THE JAPANESE BEETLE (POPILLIA JAPONICA NEWM.). N. J. Agr. Expt. Sta. Bull. 410, 29 pp. [Abstract in Rev. Appl. Ent. (A) 13: 380-381. 1925.]

Among compounds producing a larvicidal vapor in a closed chamber at 80° F. nicotine was selected for further tests. In water, only carbon disulphide and naphthalene could safely be used to destroy infestation in the soil about the roots of growing plants.

BLUNCK, H.

(1512)

1931. PSYLLIODES AFFINIS PAYK. ON TORACCO. Anz. Schadlingsk. 7 (12): 133-136, illus. [In German. Abstract in Biol. Abs. 6 (8-9): 2031. 1932. Entry 19643.]

The above insect can live on other Solanaceae besides Nicotiana, certain species of which are severely damaged while others are not touched even when the beetles are very hungry. In general those plants with highest nicotine content are least eaten.

YUASA, H., and ONEO, T.

(1513)

1930. PTILINEURUS MARMORATUS REITTER, AN ANABIID BEETLE INJURIOUS TO RUSH MATS, WITH A DESCRIPTION OF A NEW PARASITIC BETHYLID. Jour. Imp. Agr. Expt. Sta. 1 (3): 215-230, illus. [In Japanese, with a summary in English. Abstract in Rev. Appl. Ent. (A) 18: 614. 1930.]

The measures recommended against the above beetle are spraying infested mats with 1-percent nicotine solution alone or combined with carbon tetrachloride; and spraying the floor with nicotine sulphate (1 : 800), or dusting it with paradichlorobenzene before laying the mats.

ANONYMOUS

(1514)

1930. CONTROL OF RED-PUMPKIN BEETLE (AULACOPHORA ABDOMINALIS). Bombay Dept. Agr. Leaflet 9 (1930), 2 pp., illus. [Abstract in Rev. Appl. Ent. (A) 19: 715. 1931.]

Among the repellents suggested for use against the adult beetles (Rhaphidopalpa abdominalis F.) is 1 lb. fine tobacco dust or snuff mixed with 30 - 40 lb. fine road dust, 5 lb. kerosene and 3 - 5 lb. ashes.

KATSUMATA, K., and MURAE, K.

(1515)

1931. RESULTS OF THE STUDIES ON RHINONCUS PERICARPIUS L. Insect World 34: 381-385, 401-406; 35: 12-16, 49-53. 1930-1931. [In Japanese. Abstract in Rev. Appl. Ent. (A) 19: 337. 1931.]

A spray of nicotine sulphate or derris, combined with soap, is effective for control of this weevil.

DELLA BEFFA, G.

(1516)

1921. THE LEAF-ROLLER, RHYNCHITES BETULAE. R. Osserv. Fitopat., Foglio d'Istruzione 15, 3 pp., illus. [In Italian. Abstract in Rev. Appl. Ent. (A) 9: 473. 1921.]

Spraying with a 2-percent solution of nicotine is a preventive against an outbreak.

BROOKS, F. E.

(1517)

1920. ROUND-HEADED APPLE TREE BORER: ITS LIFE HISTORY AND CONTROL. U. S. Dept. Agr. Bull. 847, 42 pp., illus. [Abstract in Rev. Appl. Ent. (A) 8: 505-506. 1920.]

Nicotine sulphate killed a considerable percentage of young borers (Saperda candida F.) feeding in shallow burrows, but was not effective on large borers that had penetrated deep into the tree.

ISHIYAMA, Z.

(1518)

1920. INVESTIGATIONS ON THE WEEVIL SCEPTICUS INSULARIS ROELOFS ATTACKING THE PEANUT. Chibaken Naimubu, 8 pp., illus. [In Japanese. Abstract in Rev. Appl. Ent. (A) 8: 321-322. 1920.]

No effective remedies have been discovered. At present powdered tobacco and sprays of arsenicals are in use.

MÜLLER-THURGAU, H., OSTERWALDER, A., and JEGEN, G.

(1519)

1922. REPORT OF THE DEPARTMENT OF PLANT PHYSIOLOGY AND PLANT PATHOLOGY OF THE SWISS EXPERIMENT INSTITUTE AT WÄDENSWILL FOR THE YEARS 1917 - 1920. Landw. Jahrb. Schweiz. 36 (6): 774-784. [Abstract in Rev. Appl. Ent. (A) 11: 99. 1923.]

Sitona lineata, a pest of young peas, may be checked by dusting with tobacco.

MELIS, A.

(1520)

1933. CONTRIBUTION TO THE KNOWLEDGE OF SPHAERODERMA RUBIDUM GRABLLS. BRIEF DESCRIPTION OF THE SPECIES AND GEOGRAPHIC DISTRIBUTION IN ITALY. Redia 20: 189-228, illus. [In Italian. Abstract in Rev. Appl. Ent. (A) 21: 679. 1933.]

Two applications, with a few days' interval, of a 1 per mille nicotine nicotine sulphate spray has been found to destroy nearly all the larvae of this halticid in their mines.

HAHMANN, C.

(1521)

1930. TELEPHORID LARVAE AS PESTS IN THE GREENHOUSE. Ztschr. Pflanzenkrank. 40 (3): 117-124, illus. [Abstract in Rev. Appl. Ent. (A) 18: 431. 1930.]

The use of nicotine in the evening or early morning is suggested for combating larvae of Telephorus sp. on chrysanthemum in a greenhouse.

WEIGEL, C. A., and DOUCETTE, C. F.

(1522)

1923. CONTROL OF THE STRAWBERRY ROOTWORM IN COMMERCIAL ROSEHOUSES.
Jour. Econ. Ent. 16: 283-288. [Abstract in Rev. Appl. Ent. (A)
11: 412. 1923.]

Hydrocyanic acid gas cannot be used at a certain time, but on two or more occasions the surface water of the bed should be filmed with kerosene-nicotine-oleate to kill the adult beetles of Typophorus (Paris) canellus F. The soil in the beds should be kept covered with tobacco dust until drying-off time, with occasional applications of wood ash at monthly intervals. These will operate against larvae and pupae in the soil and newly hatched larvae that come in contact with the tobacco dust.

WEIGEL, C. A.

(1523)

1926. THE STRAWBERRY ROOTWORM, A NEW PEST ON GREENHOUSE ROSES. U. S. Dept. Agr. Bull. 1857, 48 pp., illus. [Abstract in Rev. Appl. Ent. (A) 14: 165-166. 1926.]

A layer of tobacco dust on soil was found to kill all newly-hatched larvae of Typophorus canellus F. placed on it, and it is thought that a considerable degree of control against this beetle was obtained by applying a mixture of wood ashes and tobacco dust to the surface of the soil of rose beds at intervals of about two weeks during the spring.

ANONYMOUS

(1524)

1924. LEAD-EATING INSECTS. Science 60 (1550) Sup. p. XII. [Abstract in Rev. Appl. Ent. (A) 12: 500. 1924.]

The lead-boring beetle Xylopertha declivis Lec. eats its way through lead arsenate, nicotine sulphate, and other materials tried as protective measures.

JABLONOWSKY, J.

(1525)

1914. RECENT WORK OF THE ROYAL ENTOMOLOGICAL STATION OF HUNGARY.
Monthly Bull. Agr. Intel. Plant Dis., 5 (3): 316-320. [Abstract in Rev. Appl. Ent. (A) 2: 309-310. 1914.]

Spraying with an ordinary knapsack sprayer with 2 oz. nicotine sulphate and 1 1/2 lb. soft soap in 10 imperial gal. water was effective in killing all the larvae of the corn ground beetle (Zabrus tenebrioides Goeze). Spraying with 4 lb. nicotine sulphate and 15 lb. soft soap to 100 imperial gal. water is effective against the cereal or barley leaf beetle (Lema melanopus). Sprays containing 2 oz. nicotine (either sulphate or extract) and 1 1/2 lb. of soft soap to 10 imperial gal. of water destroyed 98 - 99 percent of the larvae of Clysis ambiguella and Polychrosis botrana.

LAHILLE

(1526)

1905. METHODS TO DESTROY AN INSECT THAT ATTACKS CASUARINES. Cron. Agr. 1 (6): 88. [In Spanish.]

Against a beetle belonging to the family of Scolytidae the following mixture is used in Argentina: 2.5 kg. tobacco and 35 l. hot water. Allow this mixture to steep for 24 hours, then strain and press out the leaves and mix the solution with the following: 35 l. ox blood, 1 kg. slaked lime, and 16 kg. fresh cow dung. This mixture should be applied with a coarse brush.

HYSLOP, J. A.

(1527)

1915. WIREWORKS ATTACKING CEREAL AND FORAGE CROPS. U. S. Dept. Agr. Bull. 156, 34 pp., illus.

Reeves soaked seed corn for 24 hours in a solution of commercial tobacco extract (1 : 16). The seed was dried before planting. It was determined that tobacco solution as a repellent for wireworms (Elateridae) is quite useless (p. 32).

STELLWAAG, F.

(1528)

1928. GRAPE CULTURE AND THE PRESENT FIGHT AGAINST DISEASE. Ztschr. Angew. Chem. 41: 806-809. [In German. Abstract in Chem. Abs. 23: 469. 1929.]

Nicotine is used in fighting hvy and wireworms. From 1 to 1 1/2 kg. of an 8 to 10-percent commercial nicotine solution is added to 100 l. of spray solution. From 200 to 300 g. of cotton-oil soft soap is added as a spreader. Nicotine sulphate acts as a corrosive poison while raw nicotine is mainly a stomach poison. A mixture is most effective.

ANONYMOUS

(1529)

1915. EL GORGOJO DE LA UVA Y LA NICOTINA. Cultivador Moderno [Barcelona] 5 (4): 12.

The following mixture was sprayed on grapes infested with weevils: 0.15 kg. 90-percent nicotine, 0.5 kg. copper sulphate, 1 kg. soap-lye, and 100 l. water. It is recommended in Spain where satisfactory results have been obtained with the "Fisch" sprayer.

BÖRNER, BLUNCK, and DICKERHOFF

(1530)

1921. VERSUCHE ZUR BEKÄMPFUNG DER KOHLERD-FLÖHE UND DES RAPSGLENTZKÄFERS. Mitt. Biol. Reichsanst. Land u. Forstw. No. 22, pp. 1-41, illus.

Tobacco decoction, including nicotine sulphate and Black Leaf tobacco extract, is briefly discussed (pp. 31-32).

A tobacco decoction, containing 0.14 percent nicotine, proved more toxic to the rape beetle on rape than any other spray tried (p. 41).

CAMPBELL, R. E.

(1531)

1924. NOTES ON INJURIOUS SOUTHWESTERN CATERPILARIDAE (COL.). Ent. News 35 (1): 1-7. [Abstract in Rev. Appl. Ent. (A) 12: 117. 1924.]

In experiments in a field of bell pepper (Capricum grossum) from 6 to 8 inches high, feeding was stopoed by covering the ground immediately around the stem of the plant with fine dust such as lime, tobacco dust, or kaolin.

JOHN, H. R.

(1532)

1927. CONTROL OF BROWN AND BRONZE BEETLES IN THE ORCHARD. Jour. Dept. Agr. New Zeal. 34: 236.

The author claims to have secured a very satisfactory control from the use of Black Leaf 40. The grass-grub or brown chafer beetles did not rise in New Zealand until about the middle of January. When the trees were sprayed the beetles left them altogether.

DIETZ, H. F., and ZEISERT, E. E.

(1533)

1934. BARIUM FLUOSILICATE (DUTOX) IN BLISTER BEETLE CONTROL. Jour. Econ. Ent. 27: 73-79.

Dietz, in 1926, reported that a 1-percent concentration of nicotine oleate was a very effective control for blister beetles.

In laboratory tests, reported here, 80 percent of the blister beetles immersed in a liquid, consisting of 1.5 percent nicotine (50 percent free base), 0.4 percent coconut potash soap, and water, were killed. These tests did not warrant further experimentation (p. 75).

- 3-6 -
Index of Authors

- Abbott, W. S., 1155
Adams, R., 1042
Ahlberg, O., 899
Alov, Z., 1436
Alwood, W. B., 1230
Anderson, E. D., 966, 1422, 1424
Anderson, P. J., 1421
Anderson, T. J., 980
Andreeva, M. V., 1417
Anonymous, 834, 836, 864, 887, 928,
961, 1008, 1106, 1174, 1192, 1196,
1228, 1257, 1363, 1387, 1399, 1415,
1418, 1512, 1514, 1529
Arkell, T. R., 1166
Austin, M. D., 842, 905, 1281, 1342
Baker, W. W., 1464
Ballou, H. A., 1006
Barber, E. R., 1394
Bartsch, G., 1065
Bathelier, J., 914
Bäumler, C., 1057
Baunacke, 1332
Bautier, L., 1209
Beaumont, A., 853
Beckwith, C. S., 1231
Bedford, G. A. H., 1168, 1172
Beinhart, E. G., 1425
Bellair, G., 1102
Bernard, U., 268
Beto, 1183
Bird, R. D., 1372
Bishopp, F. C., 1132, 1170, 1181,
1211, 1217, 1234
Blunck, H., 1416, 1441, 1512, 1530
Bodenheimer, D., 838, 1277
Bogdanov-Katkov, N. M., 1351
Bogojavlenski, N. A., 1249
Bolle, P. C., 950
Bondar, G., 984, 1001, 1012, 1023
Böning, K., 257, 1318, 1324
Borden, A. D., 1275
Börner, 1530
Böttner, J., 1313
Bourne, E. A., 1050
Bourne, A. I., 1053, 1056, 1061,
1064, 1401, 1413, 1476
Bovell, J. R., 1049
Boyce, A. H., 1337, 1338
Brandly, C. A., 1158
Brammon, L. W., 1062
Brascassat, M., 1481
Breaker, E. P., 1109
Bredo, H. J., 909
Bremer, H., 1288
Brittain, W. H., 846-849, 851, 856,
1133, 1136, 1238, 1239, 1306,
1308, 1310, 1405, 1433
Britton, W. E., 866, 892, 1140, 1261,
1271, 1272, 1421, 1453, 1456, 1482
Brooks, T. E., 1517
Brower, A. E., 1385
Bruck, L., 1077
Bruner, S. C., 952
Bryant, T. R., 1184
Burkhardt, F., 1434
Burr, A., 1455
Busck, A., 1146
Bushnell, T. D., 1158
Butcher, F. G., 1282
Caesar, L., 850, 1276
Cabreres Salazar, J., 1015
Cahen, H. L., 1179
Calzavara, G., 1154
Cameron, J. E., 1029, 1032, 1420
Campbell, E. L., 1250
Campbell, J. A., 1095
Campbell, R. E., 1531
Carpas, R. F., 872
Carpenter, G. H., 852
Carter, W., 1063
Chalot, C., 968
Chamberlin, F. S., 992, 1426
Champetier, 1200
Charles, V. K., 1283
Childs, L., 933
Chittenden, F. H., 1435, 1442,
1447, 1466
Cleveland, C. R., 1307
Clyde, D., 1245
Collard, J. W., 1080
Compton, C. C., 1312
Contini, E., 1016
Cook, F. C., 1211, 1232, 1234
Cook, H. T., 1395
Cooley, R. A., 1013, 1194
Corbett, G. H., 1003
Corneli, E., 922
Cory, E. W., 885, 1269
Cotterell, G. S., 908
Crawford, D. L., 985
Crawford, H. G., 891
Crimi, F., 1201
Crosby, C. D., 860, 868, 1354
Cuirena, T., 1222
Cunliffe, N., 1130
Cunliffe, R. S., 1075

Curasson, G., 1195
 Cushing, E. C., 1237
 Cushman, R. A., 1178
 Cutright, C. E., 1184
 Da Cunha Bueno, A., 1430
 Dahlgren, E., 1138
 Daniel, D. M., 1377
 Davidson, W. M., 1365
 Davis, J. J., 1366
 Davison, A. G., 1165
 Degruilly, L., 945, 1430
 Della Boffa, G., 1332, 1513
 De Long, D. H., 1068
 Den Doop, J. E. A., 884
 De Stefani, T., 969
 Dianthus, 1483
 Dietz, H. T., 1536
 Dieuleveut, 1407
 Diffloth, P., 1136
 Dingler, M., 1334
 Dinulescu, G., 1212
 Dinwiddie, F. R., 1153
 Dodge, B. O., 1273
 Doucette, C. F., 1522
 Drake, C. J., 1323
 Draps, E., 1037
 Driggers, B. E., 1090
 Dubois, P., 1361
 Dujardin, T., 1142
 Du Flessis, S., 1235
 Durante, D., 918
 Duruz, W. P., 1369
 Dustan, A. G., 1024, 1143
 Du Toit, B. J., 1173
 Dutra, G., 876
 Dyckerhoff, 1320
 Eckstein, F., 1241
 Eichinger, 974
 Eidmann, H., 1207
 Essig, E. C., 1054, 1260, 1368
 Ewing, H. E., 1113
 Ewing, K. P., 895
 Eyer, J. R., 1497
 F. J., 1286
 Faes, H., 1135, 1381
 Fedorov, S. M., 1058
 Felt, E. P., 361, 835, 940
 Fernald, H. T., 1415, 1503
 Ferrant, V., 936
 Feytaud, J., 1574, 1426, 1491, 1494,
 1504, 1507
 Fink, D. E., 916, 1521
 Flachs, K., 858

Flebut, A. J., 1021
 Fleming, W. E., 1511
 Fletcher, M., 1137
 Flint, W. P., 1319
 Flint, W. P., 933, 1056
 Fluiter, A. J. De, 1356
 Foex, E., 937
 Forbes, S. A., 936
 Ford, W. E., 1019
 Foster, S. W., 988, 1367
 Fracker, S. B., 1330, 1486
 Frappa, C., 915
 French, C., Jr., 946, 1045, 1071
 Frickinger, H. W., 1435
 Friend, R. B., 1363, 1364
 Froggatt, W. W., 1066
 Fron, M. G., 916
 Fryer, J. C. F., 889, 890, 896, 904
 Fulmer, L., 1039, 1292, 1361, 1431
 Fulton, E. B., 1386
 Gabert, A., 1202
 Gabert, E., 1171
 Galecone, V., 1097
 Galiard, L., 1096
 Galli-Valerio, P., 1203
 Gambrell, F. L., 1028, 1339
 Gannon, C., 1425
 Gardner, A. K., 1359
 Gansen, P., 859, 1037, 1092, 1114,
 1157
 Gerasimov, E. A., 1311
 Gilmer, P. M., 1206
 Gilmore, J. W., 1268
 Ginsburg, J. M., 1119, 1403
 Girault, A. A., 977
 Glasgow, H., 874, 1309, 1315, 1339
 Glenn, F. A., 1501
 Gloyer, W. C., 1309
 Good, E. S., 1184
 Gossard, E. A., 867, 935, 1451
 Graham, S. A., 1492
 Gram, E., 1433
 Granger, A., 1409
 Gray, D. T., 1182
 Graybill, H. W., 1231
 Greve, L., 1236
 Grimes, E. W., 1265
 Gruvel, A., 1408
 Guenau, G., 1411
 Guercio, G. Del., 1014
 Gunn, D., 970
 Günther, O., 1419
 Gurney, W. B., 947, 1046, 1072

- Guyton, F. E., 1180
 Guyton, T. L., 867, 1281
 Hadley, C. L., 1397
 Haimann, C., 1321
 Hall, W. J., 1019
 Hamilton, C. C., 1089, 1270
 Hanson, A. J., 1435
 Harris, E. M., 1302
 Hartzell, E. Z., 1255, 1270
 Harukawa, C., 1391
 Haseman, L., 841, 843
 Hawley, I. M., 875
 Hayes, W. P., 1301, 1397
 Headlee, T. J., 931, 1118, 1321, 1449
 Herrick, G. W., 807, 1322, 1376
 Herrod-Hompson, W., 1210
 Hey, G. L., 907, 1370
 Higgins, J. E., 1123
 Hinds, W. E., 1219
 Hoare, A. H., 929
 Hodgkiss, H. E., 845
 Hodson, W. E. H., 853
 Hoffmann, A., 1495
 Hopkins, A. D., 1473
 Hori, M., 1496
 Horne, W. E., 1395
 Hornik, A., 1325
 Horsfall, J. L., 1051
 Horton, J. R., 976, 983
 Houser, J. C., 958
 Howard, L. C., 1239
 Hudson, H. E., 932
 Hugnier, 1214
 Hussain, M. A., 899, 1468
 Hutchinson, W. P., 1460
 Hutchinson, R. H., 1232
 Hutson, J. C., 1320
 Hyslop, J. A., 1527
 Illingworth, J. F., 1060
 Imes, M., 1167, 1173, 1176, 1178, 1188
 Inda, J. R., 877
 Iscley, D., 1478
 Ishiyama, E., 1518
 Ito, K., 1477
 Jablonowsky, J., 1525
 Jack, R. W., 1126
 Janisen, R., 1289
 Jary, S. G., 1281, 1316, 1342
 Jegen, G., 1519
 John, H. R., 1532
 Johnson, P. H., 843
 Jones, P. T., 963, 968
 Jordan, K. H. C., 1131
 Kadoosa, G., 1472
 Katsunori, T., 1515
 Kaufman, J., 1231
 Kearns, E. G. H., 1343, 1345, 1346, 1349, 1480
 Kemner, M. A., 1287
 Kent, W. G., 302
 Kinsey, M. E., 1048
 Kirillov, E., 1193
 Kloti-Hauser, E., 1510
 Knight, E. H., 873
 Knowlton, E. F., 960
 Knoll, J. E., 863
 Korff, G., 857, 1318
 Krishna Ayyar, P. M., 973
 Kwan Lun Hong, 913
 Laake, E. W., 1211, 1217, 1234, 1237
 Labor, O., 1069
 Lafferty, L. A., 878
 Lafforgue, C., 1410
 Lahille, 1526
 Langenbuch, R., 1467
 Langford, G. S., 943
 Lecaillon, A., 919
 Lees, A. H., 1459, 1509
 Legendre, J., 1240
 Lengenken, H. von, 1499
 Leonard, M. D., 860, 930, 1354
 Leplae, E., 1189
 Lesne, P., 917, 1470
 Lewis, H. C., 994, 1495
 Libera, T., 1458
 Lindblom, A., 1317, 1400
 Linke, W., 1439
 Little, V. A., 959
 Lizer, C., 297
 Lowry, C. S., 1140
 Lundblad, O., 1317
 Lunderwaldt, H., 1406
 McCulloch, J. W., 931, 1397
 McConnell, P. A., 885
 McDaniel, E. I., 1026, 1139
 McDonald, R. E., 1223
 McDonough, F. L., 1103
 MacDougall, R. S., 1215, 1218, 1329
 McGregor, E. A., 1098, 1100, 1103
 McIndoo, N. E., 1475
 MacLennan, A. H., 839
 MacLeod, G. F., 1282
 Mallanah, S., 1205
 Marchal, P., 925, 927, 1382
 Marescalchi, A., 1190

Marlatt, C. L., 1213
 Marsh, H. O., 1435
 Marsh, R. W., 1345
 Martin, H., 1342
 Martinet, G., 1471
 Mason, A. C., 979, 1149
 Mason, F. A., 1136
 Massee, A. W., 1091, 1117, 1440
 Matthewman, W. G., 1024, 1143
 Maw, W. A., 1163
 Mayet, V., 1044
 Mayne, R., 1295
 Mazzaccara, G., 1212
 Melis, A., 1520
 Menozzi, C., 1293, 1294, 1296
 Merrill, D. E., 1474
 Mesnil, L., 1487
 Middleton, W., 1358, 1378
 Miestingner, K., 1489
 Miethe, E., 1327
 Milam, J., 1268
 Miles, H. W., 1000, 1267, 1344, 1347
 Miller, D., 1251
 Milliken, F. B., 942
 Mills, A. S., 930
 Mitzmain, H. B., 1224
 Mohler, J. R., 1177, 1187
 Molz, E., 837
 Monte, O., 963, 964
 Moore, J. B., 1326
 Moore, M. H., 1348
 Moore, Wm., 1220, 1450, 1492
 Moreira, C., 883, 1445
 Morgan, W. L., 1469
 Morrill, A. W., 944
 Moulton, D., 982, 987
 Moznette, G. F., 910, 951, 998, 1010,
 1110, 1111, 1141
 Muller-Thurgau, H., 1444, 1519
 Mumford, F. B., 954, 955
 Munding, F. G., 1253, 1256
 Munger, F., 1144
 Murae, K., 1515
 Muth, F., 1123
 Nash, R. W., 1502
 Naumann, A., 854
 Newcomer, E. J., 1118, 1365
 Newell, W., 1448
 Newman, L. J., 948, 1126, 1127
 Newton, H. C. F., 1432, 1438
 Nolič, S., 1325
 Nougaret, R. L., 1365
 Obarski, J., 1355

O'Kane, W. C., 1307, 1340
 Onco, T., 1511
 Osterwalder, A., 1444, 1519
 Owen, W. J. Jr., 894
 Paillot, A., 1379, 1380, 1383
 Paoli, G., 1078
 Pape, H., 1040, 1041, 1083
 Parfentjev, T. A., 1242, 1244
 Parker, R. R., 1194
 Parker, W. B., 1099, 1124, 1443
 Parman, D. C., 1211, 1234, 1238
 Parrott, P. J., 845, 874, 1335, 1386,
 1479
 Passy, P., 1390
 Payne, L. F., 1160
 Pearce, T. J. P., 1345
 Pearson, H. M., 1059
 Peirson, H. B., 1384
 Perret-Maisonnette, 1208
 Perrott, W. H., 1004
 Pescott, E. E., 1120
 Peter, 1229
 Peters, H. S., 1217
 Petherbridge, F. R., 855, 889, 898,
 899, 902, 907, 1341, 1370, 1462
 Pethybridge, G. H., 878
 Pettit, R. H., 1052
 Phipps, C. P., 971
 Phipps, C. R., 1035
 Picard, F., 1427
 Poeteren, N. Van, 1460
 Popenoe, C. H., 1279, 1283
 Pouillaude, I., 1070
 Frowazek, S. von, 1151
 Pynaert, L., 1115
 Ramachandra, R. Y., 880, 881
 Rao, Y. R., 882
 Raymond, G., 1082
 Reed, W. V., 953
 Reinhard, H. J., 893, 894
 Rene, C., 1164, 1192, 1199
 Payne, A., 1007, 1009, 1393
 Rhynhart, F. G., 878
 Richardson, C. H., 1246
 Ritchie, A. H., 1018, 1204
 Ritzema, Bos, J., 924
 Riviere, G. 920
 Roark, R. C., 1211
 Roe, R. J., 1227
 Romanovsky-Romanko, V., 1357
 Roos, J., 1197
 Rorer, J. B., 886, 1005
 Ross, W. A., 850, 1148, 1274, 1276

- Rostrup, S., 901, 1305, 1414, 1433
Ruffier, R., 1185
Ruhmann, M. H., 1352
Runner, G. A., 1497
Russell, H. M., 1068
Russell, P. F., 1248
Russo, G., 1022, 1054
Ryle, G. B., 1093, 1130
S. W., 1412
Sanders, G. E., 847
Sanders, J. G., 1328, 1330, 1486
Sanford, H. L., 1263
Sasscer, E. R., 1275
Sayre, C. B., 1047
Scales, F. M., 1232
Scelsi, S., 1191
Scheerlinck, 1002
Schewket, N., 1467
Schiffmann, 1453
Schoevers, T. A. C., 906, 1145
Scholl, E. E., 934
Scholl, G. J., 949
Schöyön, T. R., 1030, 1258
Schneider, N., 1101
Schneider-Orelli, C., 1444
Schröder, E., 1038
Schuback, G., 1084
Schumann, C., 1112
Schwörer, 1488
Sell, R. A., 1446
Severin, H. C., 1104, 1360
Seymour-Jones, A., 1225
Shah, S. A., 1468
Shepard, H. R., 1246, 1247
Sherrard, O., 1083
Shingareva, N. I., 1243
Shomerus, 1457
Skinner, H. B., 1129
Slingerland, M. V., 1304
Smce, C., 981, 1085
Smith, C. R., 1250
Smith, F. F., 1025, 1027
Smith, J. B., 1302
Smith, K. M., 900
Smith, K. N., 1314
Smith, L. M., 1036
South, F. W., 871
Speyer, E. R., 1266
Sprengel, L., 1371, 1373
Stammerhaus, L., 950
Staniland, L. H., 903, 1254
Stanchinski, V. V., 1152
Stapel, C., 1284
Stear, J. R., 870
Steer, W., 1350, 1461, 1463
Stellwaag, F., 1134, 1388, 1528
Stephens, J. C., 949
Stewart, F. C., 874
Stübinger, H., 1402
Sullivan, W. N., 1250
Swaine, J. M., 1375
Swarbrick, T., 1343, 1346
Swenk, M. H. 965
Swift, M. E., 1273
Takagi, S., 1477
Taylor, E. L., 1131
Taylor, W. H., 1079
Tchikov, P. V., 1073
Templ, W., 1107, 1500
Tesi, B., 1498
Theobald, F. V., 888
Thomas, C. A., 1285
Thomas, I., 1370, 1462
Thomas, P. H., 1116
Thompson, B. G., 913
Thompson, H. W., 1216
Thompson, R. W., 1278
Thomsen, M., 901, 986
Thorpe, W. H., 855
Tothill, J. D., 967
Trägårdh, I., 1122, 1147
Treherne, R. C., 835, 1029, 1032
1033
Trillat, 1240
Troitzky, N. N., 1297
Trouvelot, B., 879, 921
Truelie, A., 1252
Tryon, N. H., 972
Tucker, E. S., 1303
Tucker, R. W. E., 1132
Tunnington, F., 1341
Ugryumov, G. D., 923
Uphof, J. C. T., 1398
Urich, F. W., 1074, 1076
Vandenberg, S. R., 962
Van Hermann, H. A., 1057
Vasina, A. N., 1300
Vassiliev, E. M., 1333, 1490
Vayssière, P., 1259
Veitch, R., 941
Venables, E. P., 844
Viljoen, P. R., 1175
Villeroy, F., 1169
Vinson, J., 1057
Vogelweid, V., 1105
Vosbury, E. D., 1115
Vosler, E. J., 1020
Vuillet, A., 1017

Vuisheslesskaya, N. S., 923, 1344
Wade, O., 911
Wadley, F. M., 956
Wadsworth, J. T., 1314
Wagner, R. D., 1162
Wahl, B., 1454
Wahl, C. von, 1505
Wahl, R., 1094
Wahl, R. O., 1235
Walden, B. H., 1140
Walker, H. G., 966, 1422, 1424
Wallace, F. M., 840
Wallace, F. W., 937
Walton, C. L., 1226, 1254, 1290
Warburton, C., 897
Ward, J. M. 975
Watson, J. R., 978, 989-991
Webster, F. M., 1121, 1448
Webster, R. L., 1352
Weigel, C. A., 1025, 1027, 1263,
1522, 1523
Weismann, R., 1336
Weiss, H. B., 1319, 1331
Wellhouse, W. H., 912
Wells, R. W., 1217
West, A. P., 1248
Whitcomb, W. D., 1061, 1064, 1476
White, W. H., 995
Wilhelmi, J., 1233
Williams, R. O., 1011
Wilson, H. F., 1353, 1506
Wilson, R. N., 939
Winslow, R. M., 1031
Winston, J. R., 1115
Wood, H. P., 1157, 1181
Woodworth, H. E., 1396
Worthley, H. N., 957
Yaroslavtzev, G. M., 1437
Yothers, M. A., 1118
Yothers, W. W., 979, 1149
Yuasa, H., 1513
Zappe, M. P., 866, 869, 1264, 1271
Zattler, 1108
Zeisert, E. E., 1533
Zetek, J., 1392
Zimmermann, F., 1439
Zöllig, F., 1043
Zorin, P. V., 1484

- Acanthomia tomentesticollis*, 961
Acidia heraclei, 1317, 1318
Acirtothrips citri, 976
Acysta persea, 910
Adelphocoris lineolatus, 1333
Aeolothrips fasciatus, 993
Agral I, 1341, 1343, 1345, 1349
Agromyza laterella, 1313
 " *phaseoli*, 1320
 " *simplex*, 1321-1323
Alcohol, 925, 1102, 1252, 1455
 1470, 1485, 1507
Alsophila pomataria, 1493
Altica oleracea, 1409
Ametastegiaequiseti, 1351
Anabasin, 1250, 1342
Anaphothrips signipennis, 977
Anasa tristis, 953-960
Anopheles maculipennis, 1242
Ants, 1006, 1392-1400
Aphids, 834, 836, 843, 849, 853, 863,
 864, 866, 874, 892, 934, 954, 956,
 963, 1019, 1031, 1066, 1067, 1076,
 1080, 1092, 1095, 1103, 1104, 1111,
 1114, 1115, 1118, 1119, 1120, 1247,
 1250, 1342, 1352, 1359, 1368, 1404,
 1424, 1438, 1452, 1456, 1493
Aphiochacta albidihalteris, 1280
Apion apricans, 1465
Aphis brassicae, 953
 " *gossypii*, 843, 934, 953, 955, 963
 " *malifoliae*, 849
 " *pomi*, 834, 849, 851, 866
 " *rumicis*, 863, 1247
 " *sorbi*, 866
 " *spiraecola*, 1109
Apocellus sphaericollis, 1466
Apple sucker, 849, 900
Argas persicus, 1162
Argyresthia conjugella, 1258
Arsenate, calcium, 848, 1345,
 1422, 1429, 1439
 " lead, 861, 863, 864, 866, 867,
 873, 874, 901, 902, 1088, 1095,
 1114, 1117, 1271, 1344, 1346,
 1354, 1362, 1365, 1367, 1378,
 1382, 1401, 1420, 1422, 1425,
 1429, 1433, 1440, 1461, 1477,
 1482
 " magnesium, 1063
 " sodium, 1429
Arsenic, 1402, 1405
Arsenicals, 867, 884, 1168, 1188, 1300
 1259, 1339, 1356, 1371, 1373, 1361,
 1418, 1427, 1467, 1495, 1518
Arsenious oxide, 1403
Arsenite calcium, 1436
 " zinc, 1420
Asarcopus palmarum, 1129
Ashes, 1391, 1451, 1468, 1514,
 1522, 1523
Atomaria linearis, 1467
Atractotomus mali, 896
Atta cephalotes, 1392
Aulacophora abdominalis, 1468
 " *hilaris*, 1469
Axiagastus campbelli, 967
Bagrada hilaris, 970
Brits, Blow-fly, 1234, 1235, 1237,
 1238
Barium fluosilicate, 992, 1426
Bees, 1401-1406
Bettles, 1040, 1407-1533
Bibio hortulanus, 1324
 " *marci*, 1325
"Black Leaf 40", 834, 836, 845, 846,
 848, 856, 860, 861, 863-868, 873,
 887, 891, 896, 913, 931-933, 936,
 937, 956, 953, 972, 975, 978, 983,
 989, 990, 1006, 1009, 1013, 1029,
 1031, 1032, 1034, 1049, 1074, 1095,
 1101, 1109, 1140, 1141, 1221, 1232,
 1251, 1260, 1265, 1269-1271, 1273,
 1319, 1321, 1322, 1329, 1335, 1352-
 1354, 1359, 1375, 1376, 1396, 1397,
 1420, 1424, 1443, 1452, 1456, 1474,
 1501, 1503, 1532
Black Leaf Resinate, 1270, 1271
Black leaf Tobacco extract, 983, 987,
 1068, 1100, 1442, 1530
Blissus leucopterus, 931-940
Blood, 1473, 1526
Boophilus bovis, 1153
Bordeaux and nicotine, 839, 971, 985,
 1006, 1007, 1009, 1012, 1018, 1022,
 1035, 1076, 1117, 1256, 1342, 1382,
 1410, 1411, 1413, 1420, 1422, 1424,
 1425, 1428, 1431, 1443, 1491, 1504,
 1508
Braula coeca, 1208-1210
Brontispa froggatti, 967
Bryobia, 1066, 1120
 " *pratensis*, 1121
 " *praetiosa*, 1122

- Bucculatrix canadensis* cella, 1385
 Bugs, 834-975, 1271, 1273
Byturus fumatus, 1458
 " *tomentosus*, 1459-1462
 " *unicolor*, 1464
 Calcium carbonate, 1307
 Calcium hydrate, 1229
Caliroa cerasi, 1352, 1353, 1361
Calocoris bipunctatus, 878
 " *fulvomaculatus*, 879
Calophya nigripennis, 1319
 Capsids, 834-909
 Carboic acid, 1127, 1366, 1445, 1506
 Carbon disulphide, 1396, 1511
 " *tetrachloride*, 1513
 Casein, 994, 1028, 1341
 Caseinate, 855, 902, 1018, 1118
Cassida deflorata, 1470
Cecidomyia cleariae, 1351
 " *pirivora*, 1352
Ceratophis lataniae, 1001
Chaetocnema breviscula, 1418
 " *tibialis*, 1419
 Chalk, 1000, 1316
 Charcoal, 1248
Cheimatobia brumata, 900, 901
Chortophila brassicae, 1297-1299
Cladius isomerus, 1358
 " *pectinicornis*, 1354, 1355
 Clay, 1306
*Clysia ambigua*lla, 1525
Cnemidocoptes gallinae, 1154
Cochliomyia macellaria, 1211
Contarinia pyrivora, 1253-1258
 " *viticola*, 1259
 Copper sulphate, 884, 1005, 1134, 1405, 1411, 1412, 1507, 1508, 1529
Coptodisca splendoriferella, 1271
Corythucha ciliata, 911
 " *bellula*, 912
 " *salicata*, 913
Cremastogestes, 1006
 Creosote, 1188, 1219
Crioceris asparagi, 1454-1456
 " *duodecimpunctata*, 1455, 1456
Crioceris melanopa, 1472
Cryptothrips floridensis, 978, 979
Otenocephalus canis, 1155
Culex pipiens, 1242
Culicada cantans, 1241
 " *lateralis*, 1241
 " *vexans*, 1241
 Cyanide, 880, 882, 938, 939, 950, 959, 968, 1285, 1289, 1396, 1402, 1522
Cydia pomonella, 866
 Demilysol, 1361
Dendroctonus micans, 1475
Dermapnyssus gallinae, 1158, 1162
 Derris, 1206, 1207, 1346, 1477, 1515
 Derrisol, 1064
Diabrotica speciosa, 1445
 " *trivittata*, 1446
 " *vittata*, 1447-1452
Diarthronomyia hypogaea, 1260-1267, 1276
Diarthrothrips coffeae, 980, 981
Dicyphus minimus, 876, 877
Diprion pini, 1356
Disphinctus politus, 880-882
Dolichoderus bidens, 1393
Doralis tavaresi, 1019
Doryphoradecolmacea, 1448
Drepanothrips reuteri, 932
 Dung, 1473, 1528
Dysdercus, 871, 872
Echidnophaga gallinacea, 1162
Elasmognathus nopalensis, 914
Empythus cinctipes, 1352
 " *cinctus*, 1354
Empoasca minucuda, 1110
 Emulsion, ammonium caseinate oil, 913
 " benzol, 946, 1071
 " carboic acid, 970
 " distillate oil, 937, 988
 " kerosene, 835, 883, 892, 911, 931, 941, 946, 947, 965, 986, 972, 973, 977, 982, 1017, 1054, 1066, 1069, 1080, 1113, 1116, 1136, 1136, 1223, 1234, 1230, 1271, 1319, 1442, 1486, 1501, 1503
 " linseed oil, 1114
 " paraffin, 1085, 1459
 " Volck-oil, 1179
 " white oil, 1090
Endelomyia roseae, 1354
Engytatus geniculatus, 883
 " *notatus*, 883
Eomenacanthus stramineus, 1162
Epilachna corrupta, 1474-1476
 " *niponica*, 1477
Epitrix cucumeris, 1420-1422, 1424
 " *parvula*, 1425, 1426
 " *subcrinita*, 1423
Eriocampa adumbrata, 1357
Eriocampoides aethiops, 1358

- Eriocampoides cerasi*, 1359
 " *limacina*, 1360-1362
Eriophyes malifoliae, 1133
 " *pyri*, 1124
 " *vitis*, 1125
Eriosoma lanigerum, 1095
Erythroneura comes, 960
Eurytoma orchidearum, 1327
Euthrips citri, 983
 " *manihoti*, 984
 " *occidentalis*, 985
 " *parvus*, 986
 " *pyri*, 987, 988
 " *tritici*, 989
Femusa pumila, 1363, 1364
Flea, earth, 1128
Flea hopper, cotton, 893-895
Fleas, 1155, 1162, 1205, 1207
Flies, 1170, 1208-1238, 1250-1340
Flour, 834
Foliage injury, 1345, 1370, 1397,
 1426, 1433
Frankliniella bispinosa, 990, 991
 " *cephalica*, 998
 " *fusca*, 992
 " *occidentalis*, 993
Fumigation, 854, 917, 919, 925, 926,
 986, 996, 997, 999, 1002, 1037-
 1039, 1040, 1042-1044, 1065, 1066
 1070, 1083, 1144, 1145, 1151, 1208,
 1220, 1239, 1240, 1242-1245, 1249-
 1263, 1274, 1275, 1279-1281, 1283,
 1284, 1289, 1326, 1327, 1331, 1392,
 1396, 1406, 1450, 1499, 1500, 1509
Galeatus involutus, 915
Galeruncella cavicollis, 1478, 1479
 " *lineola*, 1480
 " *luteola*, 1481, 1482
 " *viburni*, 1484
Gargophis solani, 916
Gastrophilus intestinalis, 1212
Glue, 874
Goniocotes gallinae, 1162
Gracilaria azalcella, 1002
Gymnonychus californicus, 1365
Haematobia serrata, 1213
Haemotopinus asini, 1178
 " *eurysternus*, 1180
 " *vituli*, 1180
Halotydaeus destructor, 948
Haltica ampelohaga, 1428-1430
 " *oleracea*, 1431
Heliothrips fasciatus, 994
 " *femoralis*, 995, 999
 " *haemorrhoidalis*, 996-1002,
 1110
 " *indicus*, 1003
 " *obsoleta*, 1004
 " *rubrocinctus*, 1005-1012
Hellebore, 1353, 1354, 1359
Hemeleia, 1018
Heterocordylus malinus, 860-863
Hoplocampa brevis, 1366
 " *cookei*, 1367-1369
 " *flava*, 1370-1373
 " *fulvicornis*, 1371
 " *halcyon*, 1372
 " *minuta*, 1373
 " *testudinea*, 1341-1350
Hydrogen ion, 923
Hylemyia brassicae, 1300
 " *cillicrura*, 1301
Hypera arator, 1465
Hypocotone-paste, 1236
Hypoderma, 1214-1217
 " *bovis*, 1218
 " *lineatum*, 1218
Illinoi pisi, 1456
Infusorial earth, 1426
Insecto, 1413
Irichodectes parumpilosus, 1178
 " *pilosus*, 1178
Iridomyrmex humilis, 1394
Isosoma orchidearum, 1326, 1327
 1331
Ixodes bovis, 1153
Jalysus spinosus, 971
Kaliosysphinga dohrni, 1375
 " *ulni*, 1376
Kerosene, 1161, 1192, 1196, 1407, 1468
 1514, 1522
Lachnosterna, 1486
Lead acetate, 1402
 " *chromate*, 1420
 " *nitrate*, 1402
Leaf hoppers, 888, 960, 1110
Lema cyanella, 1488, 1489
 " *flavipes*, 1491
 " *melanopa*, 1489, 1490, 1525
 " *tristis*, 1491
Lepidosophes ulmi, 937, 1272
Leptinotarsa decemlineata, 1492, 1493
Leptobyrsa rhododendri, 1271
Leptoglossus gonagra, 962, 963

- Lethalate, 1349
 Lethal doses, 1402
 Lethol, 1218, 1228
 Lice, 1150-1169, 1178, 1180, 1181, 1186
 1188-1194, 1205, 1204, 1207, 1236
 Lime, 851, 858, 861, 893, 940, 990
 994, 1005, 1031, 1088, 1151, 1216 -
 1218, 1225, 1227, 1239, 1242, 1263,
 1283, 1286, 1345, 1355, 1362, 1412,
 1422, 1430, 1454, 1442, 1451, 1468,
 1469, 1473, 1488, 1489, 1506, 1526,
 1531
 Lime sulphur, 834, 848, 861, 865-867,
 863, 875, 874, 889, 902, 911, 976,
 978, 979, 983, 989, 990, 998,
 1003, 1004, 1010, 1013, 1018, 1019,
 1020, 1029, 1035, 1040, 1046, 1087,
 1089, 1092, 1094, 1110, 1107, 1113,
 1114, 1117, 1119, 1124, 1130, 1172,
 1177, 1187, 1253, 1258, 1345, 1369,
 1374, 1401, 1405
 Limnobia ultima, 1268
 "Lion Brand" 1168
 Liothrips montanus, 1013
 " oleae, 1014-1016
 Lipeurus caponis, 1162
 " heterographus, 1156, 1162
 Liponyssus bursa, 1157, 1158
 " sylvianum, 1159-1163
 Listrodars obliquus, 1495
 Lopidea davisi, 885
 Luperodes praeustus, 1496
 Lupinine 1250
 Lygidea mendax, 851, 860-870
 Lygus campestris, 854-857
 " communis, 847-851, 862, 1276
 " invitus, 845, 846
 " kalini, 858
 " omnivagus, 859
 " pabulinus, 852-855, 901, 904,
 905, 1040
 " paulinus, 858
 " pratensis, 834-844, 1040
 " quescalbae, 859
 Lyperosia irritans, 1219, 1223
 Lysol, 1292, 1454
 Macroductylus subspinosus, 1497
 Macrosiphum ribelium, 1109
 " sanborni, 1109
 " solanifolii, 864, 892
 1452
 Mange, 1171, 1178, 1195, 1197-1202
 Mealybugs, 871, 1006
 Meligethes aeneus, 1460
 Melophagus ovinus, 1164-1168
 Menziesia vicina, 968
 Menopon gallinae, 1162
 Mercury bichloride (corrosive sublimate)
 1298, 1299, 1308, 1308, 1310, 1312, 1392
 Metallus rubi, 1377
 Miners, 1259, 1269-1273, 1319-1325, 1328-
 1333
 Mites, 1028, 1086-1149, 1152, 1157, 1182,
 1183
 Molasses, 1270, 1273
 Monalonia atratum, 286
 Monarthralpalpus buxi, 1269-1273
 Mordellistena beyrodti, 1499
 " cattleyana, 1500
 Mosquitoes, 1239-1250
 Moth, codling, 866, 874
 " vine, 1259
 " winter, 900
 Murgantia histrionica, 965
 Musca domestica, 1220
 Muth's solution, 1125
 Myzus persicae, 864, 1456
 " rubis, 1106
 Naphthalene, 1467, 1498, 1511
 Neocerata rhodophaga, 1274-1276
 Neodiprion lecontei, 1378
 Neurocolpus nubilis, 891
 Neurotoma nemoralis, 1379-1383
 "Nicodust" 1034
 Nicotame, 1326, 1450
 Nicotiana, 1512
 Nicotine aborts embryo, 1383
 Nicotine carriers, 1217
 Nicotine, benzoyl, 1403
 Nicotine dust, 841, 844, 851, 859, 895,
 902, 905, 943, 957, 959, 982, 990,
 991, 1022, 1036, 1032, 1036, 1114, 1142,
 1155, 1180, 1217, 1512, 1334, 1339,
 1344, 1383, 1440, 1456, 1464, 1475
 Nicotine, evolution of, 1112, 1229
 Nicotine ions and molecules, 1245
 Nicotine, iron, 1403
 Nicotine, its free base vs. its
 salts, 1246
 Nicotine oleate, 937, 1137, 1403,
 1522, 1533
 Nicotine papers, 1263, 1274
 Nicotine, Pratt's, 1452
 Nicotine, pure, 945, 1228, 1383,
 1491
 Nicotine resinate, 1301

- Nicotine sulphate, 847, 850, 851, 862, 874, 875, 879, 883, 886, 902, 911, 930, 934, 935, 940, 941-944, 947-949, 952, 956, 958, 965, 977, 982, 991, 992, 995, 999, 1003, 1011, 1034, 1034, 1031, 1040, 1047, 1048, 1050, 1051, 1057, 1059, 1063, 1064, 1080, 1083, 1084, 1087, 1089, 1090, 1092, 1103, 1114, 1116, 1118, 1123, 1135, 1137, 1143, 1158-1163, 1170, 1174, 1215, 1217, 1237, 1238, 1253, 1255, 1258, 1261, 1268, 1276, 1283, 1287, 1288, 1290, 1293, 1294, 1296, 1316, 1317, 1325, 1339, 1355, 1364, 1369, 1377, 1378, 1383, 1385, 1392-1394, 1401, 1417, 1433, 1456, 1462, 1472, 1476, 1477, 1482, 1487, 1493, 1496, 1502, 1513, 1509, 1515, 1517, 1520, 1524, 1525, 1528, 1530
- Nicotine sulphate, (40%), 840, 843, 855, 863, 867, 885, 910, 916, 923, 951, 953, 960, 976, 979, 998, 1004, 1005, 1010, 1018, 1052, 1055, 1077, 1099, 1104, 1111, 1158, 1189, 1157, 1173, 1179, 1181, 1211, 1228, 1234, 1259, 1262-1264, 1301, 1323, 1328, 1330, 1337, 1358, 1360, 1363, 1365, 1366, 1413, 1421, 1425, 1435, 1478, 1479, 1486
- Nicotine sulphur dip, 1173
- Nicotine sulphur dust, 1129
- Nicotine tartrate, 884,
- Nicotine, tin, 1403
- Nicotine, titrated, 1164, 1198, 1199, 1380, 1381, 1411, 1428, 1505, 1507, 1508
- "Nikoteen" 1452
- Notophallus bicolor, 1136, 1127
- Nysius ericae, 341-343
- " minutus, 342
- " senecionis, 343
- " vinitor, 343-348
- Oil and nicotine combined, 995, 994
- 1032, 1034, 1055, 1092, 1098, 1100, 1105, 1119, 1236, 1272, 1245, 1367, 1368, 1372, 1385, 1435,
- Oil distillates, pine, 1404
- Oil, mineral, 1173
- Oil, miscible, 362, 1103
- Oil, pine, 1213
- Oil, tar, 939
- Oil, tobacco, 1301
- Oil, vegetable, 843
- Oligonychus ulmi, 1091
- Oncoscelis sulciiventris, 972
- Orchestes canus, 1501
- " rufipes, 1502
- Orthaea vineta, 949
- Orthotylus marginalis, 896
- Otiorrhynchus ovatus, 1503
- " sulcatus, 1504
- Ovicides, 939, 940, 962, 978, 999, 1009, 1026, 1086, 1089, 1090, 1105, 1119, 1121, 1162, 1259, 1266, 1328, 1350, 1364, 1383, 1492, 1496
- Oxypleurites carinatus, 1131,
- Paracalocoris hawleyi, 875
- Paradichlorobenzene, 1284, 1313
- Paraffin, 1459, 1509
- Paralyses, 1428,
- Paratetranychus heteronychus, 1129
- " pilosus, 1087-1092, 1122
- " ununguis, 1093, 1130
- Paris green, 1028, 1248, 1249, 1355, 1422, 1436, 1460
- Parthenothrips dracaenae, 999
- Pasiphae iheringi, 1406
- Pediculus humanus, 1151
- " ovis, 1169
- Pegomyia cepetorum, 1302
- " fusiceps, 1303
- " hyoscyami, 1286-1296
- Penetrol, 1385
- Penthaleus destructor, 1132
- Petroleum, 1215, 1233, 1361
- Phaedon cochleariae, 1505
- Phaenacantha saccharicida, 949
- Phenicated tobacco extract, 918, 922, 1190, 1483
- Phlaeotribus liminaris, 1506
- Phorbia brassicae, 1304-1311
- " ceparum, 1312
- Phorodon humuli, 1342
- Phratora vulgatissima, 1507, 1508
- Phthis picta, 934
- PH value of nicotine solutions, 1346
- Phyllocoptes schlectendali, 1133
- " vitis, 1134
- Phyllocta vitellinae, 1509
- " vulgatissima, 1510
- Phyllotoma nemorata, 1384, 1385
- Phyllotreta armoraciae, 1437
- " atra, 1434, 1437
- " cruciferae, 1434
- " nemorum, 1433, 1434, 1436, 1437

Phyllotreta nigripes, 1434
 " pusilla, 1435
 " undulato, 1434, 1436, 1437
 " vittata, 1437, 1448
 Phylloxera carysecaulis, 836
 Physiological salt solution, 1228
 Phytosorhrips pyri, 1017
 " xanthocerus, 1018
 Phytomyza chrysanthemi, 1330-1332, 1460
 " geniculata, 1333
 Phytoptus vitis, 1135
 Piezodorus incarnatus, 969
 Plants with highest nicotine content
 least eaten, 1510
 Plaster of Paris, 1182
 Platyparea poeciloptera, 1324
 Plesiocoris fugicollis, 896
 " rugicollis, 897-907
 Poecilocapsus lineatus, 892
 Pollemia rudis, 1335
 Polychrosis botrana, 1525
 Popillia japonica, 1511
 Potassium oleate, 940
 Profenusa collaris, 1386
 Psallus amibiguus, 896
 " seriatus, 894, 895
 Pseudococcus citri, 1006
 Pseudolynchia maura, 1170
 Psila rosae, 1318
 Psoroptes communis, 1171, 1172
 " ovis, 1173, 1174
 Psychoda alternata, 1221
 Psylla buxi, 1273
 " mali, 849, 900
 " pyricola, 865
 Psyllids, 1319
 Psylliodes affinis, 1040, 1512
 " attenuata, 1438-1440
 " chrysocephala, 1434, 1441
 " napi, 1434
 " punctulata, 1442, 1443
 Pteronon ribesii, 1387-1389, 1433
 Ptilineurus marmoratus, 1513
 Pyrethrum, 926, 966, 968, 977, 1000, 1040, 1043, 1083, 1157, 1231, 1254, 1285, 1326, 1381, 1404, 1429, 1477, 1487, 1495
 Pyridine, 1144
 Pyrox, 1413
 Quassia, 857, 1094, 1122, 1130, 1147, 1379, 1380, 1412
 Quinine, 1249

Quinoleine, 1240
 Red spiders, 998, 1086-1119
 Repellents, 962, 969, 991, 1060, 1144, 1146, 1152, 1211, 1212, 1224, 1231, 1233, 1241, 1301, 1303, 1318, 1374, 1392, 1397, 1400, 1401, 1405, 1407, 1422, 1435, 1443, 1452, 1468, 1475, 1504, 1507, 1514, 1527
 Resin, 975, 1120, 1395
 Retithrips aegyptiacus, 1018
 Rhagoletis cerasi, 1336
 " cingulata, 1339
 " completa, 1337, 1338
 " fausta, 1339
 " pomonella, 1340
 Rhaphidopalpa abdominalis, 1514
 Rhinoncus pericarpus, 1515
 Rhipicephalus appendiculatus, 1175
 Rrizoglyphus echinopus, 1136
 " hyacinthis, 1137-1139, 1028
 Rhopelosiphum dianthi, 1366
 Rhynchites betulae, 1516
 Road dust, 1468, 1514
 Rotenone, 1247, 1250
 Sahlberrgella, 908, 909
 Salix fragilis, 1494
 Salt, 1506
 Saperda candida, 1517
 Sarcoptes scabiei, 1176-1178
 Sawflies, 1341-1391
 Scab, 1173, 1174, 1176-1179, 1184, 1187
 Scalecide, 1087
 Scale insects, 937
 Scalp, 1006
 Scepticus insularis, 1518
 Selenothrips rubrocinctus, 1022
 Sciara agraria, 1279, 1280
 " fenestralis, 1281
 " multiseti, 1279, 1280
 Scirtothrips aurantii, 1019
 " citri, 1020, 1021
 " dorsalis, 880, 881
 Simulium columbaezense, 1222
 Sitona lineata, 1519
 Snuff, 991, 1192, 1514
 Soap, 836, 838, 840, 845, 851-853, 855-858, 860, 865, 875, 878-883, 885, 887, 889, 891, 892, 897-903, 905-907, 910, 915, 916, 918, 922, 923, 925, 926, 928, 929, 931-937, 939, 942-944, 948, 952, 960, 963-

Soap, (continued)

965, 967, 969, 970, 974, 978-981,
990, 994, 997, 998, 1000, 1002,
1003, 1006, 1008, 1009, 1010, 1013,
1014, 1017, 1018, 1023, 1026, 1029,
1031-1033, 1035, 1038, 1040, 1042,
1045, 1047, 1048, 1049, 1051-1053,
1055, 1057, 1058, 1061, 1066, 1068,
1070-1072, 1075, 1077, 1081, 1082-
1084, 1097, 1102-1111, 1114, 1118,
1123, 1125, 1130, 1134, 1135, 1140,
1141, 1157, 1169, 1170, 1189, 1192,
1201, 1213, 1219, 1223, 1252, 1254,
1256, 1262, 1265-1268, 1270, 1272,
1276, 1277, 1283, 1290, 1292, 1295,
1319, 1321-1324, 1330, 1341, 1342 -
1344, 1345, 1348, 1350, 1358-1360,
1363, 1365, 1368, 1370, 1374 -
1376, 1379-1381, 1383, 1384, 1386,
1388, 1400, 1404, 1407, 1421, 1435,
1444, 1455, 1459, 1461-1463, 1465,
1468, 1470, 1474, 1476, 1478, 1480,
1482, 1485, 1491, 1493, 1496, 1502,
1503, 1505, 1507, 1509, 1515, 1525,
1528, 1529, 1533

Soda, 969, 975, 1086, 1198, 1199, 1395
Sodium carbonate, 915, 1101, 1102, 1238,
1455, 1470, 1507, 1508

Sodium fluoride, 1162, 1402, 1467
" silicate, 1363
" sulphide, 848

Solenopsis geminata, 1395, 1396
" molesta, 1397

Soot, 1061, 1064, 1286, 1434, 1481

Sphaeroderma rubidum, 1520

Spreaders, 1004, 1019, 1118, 1124

Springtails, 1284

Stephanitis pyri, 919-923

" pyrioides, 1444

" rhododendri, 925-929

Stibaropus tabulatus, 973

Stomoxys calcitrans, 1223

Strychnine tartrate, 884

Sugar, 1028, 1336, 1337

Sulphur, 858, 867, 874, 893, 894,
982, 991, 1000, 1060, 1088, 1091,
1114, 1154, 1157, 1165, 1169,
1173, 1176, 1183-1187, 1189, 1201,
1245, 1277, 1306, 1333, 1339, 1362,
1398, 1481, 1493, 1498, 1504

Sulphur, atomic, 982, 1116

Stylothrips bondari, 1023

Tabanus striatus, 1224

Taeniothrips gladioli, 1024-1028,

" inconsequens, 1029-1036

" pyri, 861

Tar-distillate washes, 888, 1091

Tarsonemus pallidus, 1140-1144

Telephorus, 1521

Tenthecoris bicolor, 1107

Tenthredo adumbrata, 1390

Tetrachlorethane, 1218, 1228

Tetramychnus althaeae, 1122

" binaculatus, 1098-1100

" telarius, 1103-1111

" yotheri, 998, 1010, 1110, 1102

"Thanetum" 1472

Thrips, 861, 880, 881, 949, 976-1085, 1111, 1476

Thrips angusticeps, 1038

" flava, 1039-1041

" haemorrhoidalis, 1041-1043

" oleae, 1044

" tabaci, 949, 1033, 1041, 1045-1063,
1109

Ticks, 1153, 1164-1168, 1178, 1185, 1186, 1196

Tingids, 910-930

Tingis pyri, 917-923

" rhododendri, 924-929

Tipula oleracea, 1277

Tobacco as stomach poison, 1338, 1428

Tobacco dust, 854, 867, 874, 880, 882,
893, 894, 922, 938, 940, 991, 1002,
1021, 1039, 1040, 1060-1061, 1063, 1064,
1090, 1112, 1115, 1127, 1143, 1146,

1151, 1155, 1156, 1170, 1205-1207,

1216-1218, 1225-1227, 1228, 1231,

1243, 1245, 1249, 1263, 1274-1276,

1278, 1282, 1298-1300, 1302, 1303

1305-1307, 1309-1311, 1313, 1315,

1318, 1338, 1357, 1387, 1391, 1398,

1403, 1418, 1420, 1426, 1430, 1434-

1437, 1443, 1447, 1449, 1452, 1453,

1466, 1468, 1469, 1484, 1498, 1514,

1518, 1519, 1522, 1523, 1531

Tobacco smoke, 1208-1210, 1406

Tobacco stems plowed under, 1447

Tobacco tea, 1395

Tomostethus juncivorus, 1391

Trichodectes scalaris, 1164, 1180

Trioxa alacris, 1444

" merwei, 981

Triphleps majuscula, 838

Typhlocyba rosae, 1444

Typhophorus canellus, 1522, 1523

Tyroglyphus dimidiatus, 1145

" lintneri, 1146

Urania green, 1388, 1431

Vaselina, 1183, 1201

Xylastodoris luteolus, 951, 952

Xylopertha declivis, 1524

Zabrus tenebrioides, 1525

Zinc sulphate, 1422

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